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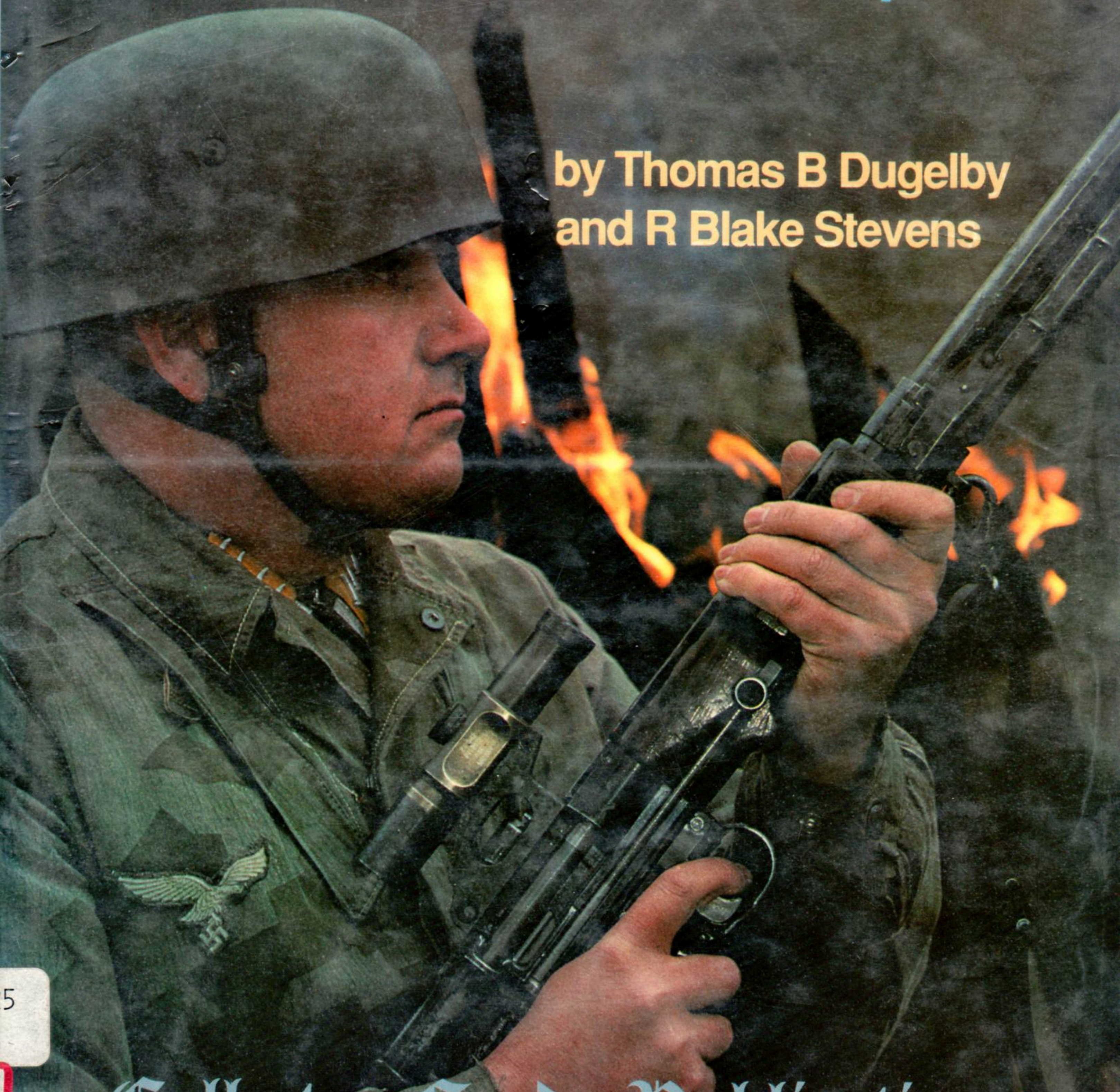
Death From Above

The German FG42 Paratroop Rifle



by Thomas B Dugelby
and R Blake Stevens

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Produced and Edited by R Blake Stevens

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Toronto, Canada
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Prologue

The Enigma of the FG42

The FG42 was conceived and designed expressly for use by Airborne forces under the most gruelling combat conditions imaginable. It was produced by German industry, outside of normal Ordnance channels, in a rapidly worsening climate of encirclement and deprivation during the cataclysmic last years of World War II. These grim facts explain why relatively few FG42s were ever made, and why the even fewer survivors are so rare today.

At the same time, the harshness of these exigencies makes it all the more remarkable that the FG42 has, more than any other single weapon and certainly out of all proportion to its production numbers, so strongly influenced the design of modern military shoulder arms. The FG42 is, quite simply, the true father of the full-powered assault rifle.

Created to mount a desperate offense and largely destroyed within a crumbling defense, the very existence of the FG42 portends an amazing story of innovation and determination against the ineluctable backdrop of the fortunes of war.

Introductory Note on Translation

Most of the source documents used in the preparation of this book were originally written in a ponderously pedantic form of technical German which, if translated literally, can make for tiresome and confusing reading. Thus in the trials reports, manual reprints and the nomenclature of certain components such as the German *unterbrecher* (literally the "underbreaker"; herein termed the "interruptor"), the text has been *transliterated* to provide a technically correct yet readable translation which conforms with established convention. In this we gratefully acknowledge the indispensable assistance of Tom Dugelby's wife Imola, whose excellent command of both English and German has greatly aided us in our quest to provide a clear meaning while retaining the essence of the original.

Chapter One

The Birth of the Concept

German airborne forces, originally established as small, fledgling units during the era of the Nazi party's ascendency, grew rapidly in strength during the late-thirties period of German military rearmament and were deployed by the Luftwaffe in several dramatically successful engagements during the early stages of World War II. Significantly, however, regular tactical use of the massed airborne assault was virtually abandoned by the Germans less than two years later.

This decisive change in tactics was a result of 'Operation Merkur', the bloody battle for the Greek island of Crete in May of 1941, which included airborne assaults against four major objectives. One such action, against the airport at Maleme in the northwest corner of the island, featured troops of 1 Battalion of the German Assault Regiment under the command of Major Walter Koch, himself a veteran of the previous year's victorious glider attack on Eben Emael, the cornerstone of a string of fortresses which the Belgians had built in a vain attempt to safeguard the Albert Canal.

Following initial glider landings, which immediately came under heavy fire, waves of German paratroopers or *Fallschirmjägere* were forced by the constraints of the rugged terrain to jump from a minimum height of 400 feet right under the guns of the well-dug-in British defenders, largely New Zealanders from 5 Brigade's 22nd Battalion whose commanding officer, Brigadier Puttick, had been alerted to the German plan by an 'Enigma' source.

The men from the German jump-strings who survived the landing found themselves in a most vulnerable position, with only their pistols and submachine guns for initial defence. Quickly shedding their parachutes and harnesses, they discovered that the drop had spread them over distances of up to 300 metres within enemy-held territory. Under these conditions they were forced to begin the dangerous task of retrieving their rifles, machine guns, ammunition and other supplies. These, being too heavy and clumsy to jump with, had been dropped in separate containers which were now scattered all over the battlefield. As a consequence of this fateful chain of events the outgunned German paratroopers were decimated in the early stages of the battle.

The badly bungled battle for Crete was eventually won by the Germans and many Allied prisoners were taken, but it proved a very costly victory, not only in terms of German casualties (over 3,200 killed and almost 3,500 wounded out of a total force of 22,000 men) but also for the future of the Airborne as an important operational wing of the Luftwaffe. After the battle, Hitler rebuked General-Major Kurt Student, an ex-World War I fighter pilot and the 'father' of the German Airborne Force, concluding: "Crete has shown that the days of the paratrooper are finished!"

Nevertheless, soon after this débâcle, Senior Staff Air Secretary Ossenbuch at the Luftwaffe Testing Station GL/C-E6 at Tarnewitz, near Lübeck, was approached with a request that a special new weapon be developed to replace the conventional arsenal of pistols, sub-machine guns, rifles and machine guns then available to Airborne troops. The initial informal specification called for an arm not to exceed 1 metre (39.3") in length, capable of semi- and full-automatic fire, weighing about the same and shooting the same cartridge as the standard K98k bolt-action rifle.

This last feature was insisted upon by the paratroopers, in spite of the parallel development of the promising medium-range 7.92x33mm *kurz* cartridge, for two significant reasons. First, although German field commanders throughout Europe had more or less agreed on 450 metres as the maximum effective infantry combat distance (thus sanctioning the development of the *kurz* round in the first place), the paras who had fought in Crete had vivid memories of the uselessness of their pistols and sub-machine guns in preventing their comrades' being picked off by well-aimed enemy .303-calibre rifle and Bren gun fire at ranges of up to 1,600 metres. Secondly, a revision to the order of battle following Hitler's displeasure at the expense of Operation Merkur meant that henceforth the paratroops were no longer to be attached to the Luftwaffe, but would be dropped into action in limited numbers and with very limited supplies of ammunition, the intent being that once on the ground they would operate with, and be supplied by, the infantry.

The First Formal Design Specification

A document entitled "Technical Demands for the Development of a Paratroop Rifle, Specification LC-6" was prepared by Luftwaffe Pilot Chief Engineer Ossenbuhn and Chief Weapons Inspector Otto Schulze, and issued by the Aircraft Armaments Section GL/C-E6. A copy of this document was discovered among the surviving records of the Luftwaffe's Tarnewitz Ordnance Testing Station after the war. In translation it reads as follows:

1. Not to exceed one metre in length.
2. Not to be heavier than the standard K98k rifle.
3. Calibre to be the [7.92x57mm] standard service cartridge.
4. To have detachable magazines, one with a minimum of 10 rounds capacity and another of 30 rounds.
5. To have selective fire capability using the simplest mechanism and to fire from a closed bolt in semi-auto fire and an open bolt in full-auto fire.
6. To be free from stoppages.
7. To have a 1½-power telescopic sight with recoil-proof optics.
8. To be equipped with a grenade launcher.
9. To be equipped with a bayonet, preferrably attached and folding.
10. To be capable of being used as a club in close-combat situations.
11. No necessity for a removable barrel.
12. The barrel must have a life of at least 2,000 rounds even when fired in the burst mode.
13. To be provided with a collapsible grip for the left hand so that the weapon will not entangle clothing or equipment when jumping.
14. To be provided with a folding bipod for firing from the prone position.
15. The butt to be designed to absorb recoil.
16. The weapon must be stable and not jump around when firing.
17. Protection to be provided against dirt entering the mechanism.
18. The weapon must not be sensitive to shocks and drops when in use.

"Catch-22" – The Early Design Authority Dilemma

At first glance the *Heereswaffenamt* (the HWaA, or Army Ordnance Department) seemed the logical entity to oversee the development of a weapon from the LC-6 specification, but the HWaA declined to do so, due largely to the long-standing rivalry among the different branches of the German armed services. The Army staff, conscious of their ranking as the senior service, tended to look down their noses at the Luftwaffe and called them the "necktie soldiers". As a result the Luftwaffe was forced to start looking within its own ranks for action on such a specialist development as the proposed new paratroop rifle.

As it happened, the engineers on staff at the Luftwaffe Testing Station at Tarnewitz had already acquired considerable expertise in developing high-performance, lightweight weapons, and had recently completed the successful conversion of the MG15 aircraft machine gun to a ground-mounted configuration. Plans were therefore tentatively laid to create a central authority for the new programme at that station. However, Hitler, who had initially been most impressed with the concept of a special paratrooper rifle, had decisively changed his mind about the tactical value of airborne assaults immediately after Operation Merkur and hence had no further use for such a weapon. (The fact that the German arms industry as a whole was already becoming overburdened with the design and production of a proliferation of weapons types tended to lend further force to this argument.)

Nevertheless, after consultation with General-Major Student, Luftwaffe *Reichsmarschall* Hermann Göring issued private instructions for the continuation of the paratroop rifle project. A request for prototype designs was accordingly issued by the German Air Ministry, under the LC-6 specification, to the following companies:

1. Gustloffwerke (Berliner-Suhler-Werke), Suhl
2. Johannes Grossfuss Metall-und Lackierwarenfabrik, Dobeln
3. C G Hänel Waffen und Fahrradfabrik, Suhl
4. Heinrich Krieghoff Waffenfabrik, Suhl

5. Mauser Werke A G, Oberndorf am Neckar
6. Rheinmetall-Borsig, Sömmerda

To the intense disappointment of Luftwaffe GL/C-E6, only Krieghoff and Rheinmetall answered at all favourably. Mauser Werke offered their belt-fed MG81 on a converted ground mount, which did not fit the LC-6 magazine-feed specification and was therefore rejected. The other companies stated that they could not even consider the request, as all such orders had to be sanctioned by the *Heereswaffenamt* for whom they were already working to capacity.

The out-of-hand refusal of Army Ordnance to oversee the project, together with the lack of response from industry, was thus doubly disheartening to the proponents of the new weapon. Nevertheless, both Rheinmetall and Krieghoff were encouraged to proceed with their respective versions of a design to meet the LC-6 specification, and Chief Weapons Inspector Otto Schulze of Luftwaffe GL/C-6 was assigned to coordinate the task as Project Manager.

Chapter Two

The Early Prototypes

Overview to a Most Unique Development

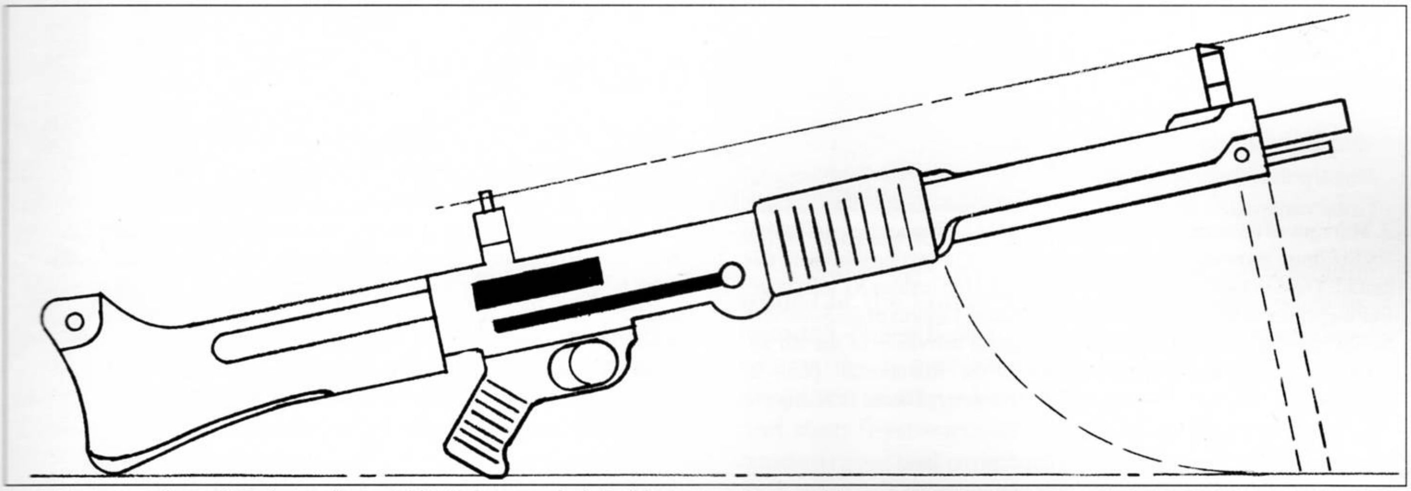
Before beginning the actual discussion of the various models and types of assault rifles produced under the LC-6 specification it is significant to note that, as audacious as these weapons were to appear in actual form and function, the path taken in their development was equally without precedent in the annals of German Ordnance production history.

Due to the élitist nature of the design specification, the *Heereswaffenampt's* consequent disavowal of the entire project and Hitler's displeasure with the Airborne after Operation Merkur, the FG42 was unable to 'plug in' to anything resembling a normal Ordnance development programme until the middle of 1943, by which time Germany was already feeling the strain of four years of war against the Allies. Time and test facilities for perfecting new weaponry (to say nothing of exotic raw materials) were thus severely limited, and in consequence the FG42 fell heir to a virtually constant series of *ad hoc* improvements and modifications throughout its entire brief lifespan.

An interesting series of articles on the FG42, published in 1980 in the German-language journal *Waffen Revue* and translated the following year by the US Army Foreign Science and Technology Centre under the title "German Paratrooper Rifle FG42; Tests and Description", comments on this continuous state of flux in the FG42 programme as follows: "..If we should take all known designs [of the FG42] into account, then the number of such models would be far above 20, and would not merely be restricted to [the] 3 models which are differentiated in the post-war literature.."

For reasons of security as well as sheer practicality, this proliferation of weapon models and types, together with the two user manuals (and one addendum) issued by the Luftwaffe during the course of the programme, were all designated simply 'FG42'. The latest available model was always described in the documentation, but otherwise the reality of constant change was ignored as completely as possible.

Of the over 20 variants mentioned, a basic series of seven models, to be discussed under the headings of types 'A' through 'G', are herein discussed in detail.



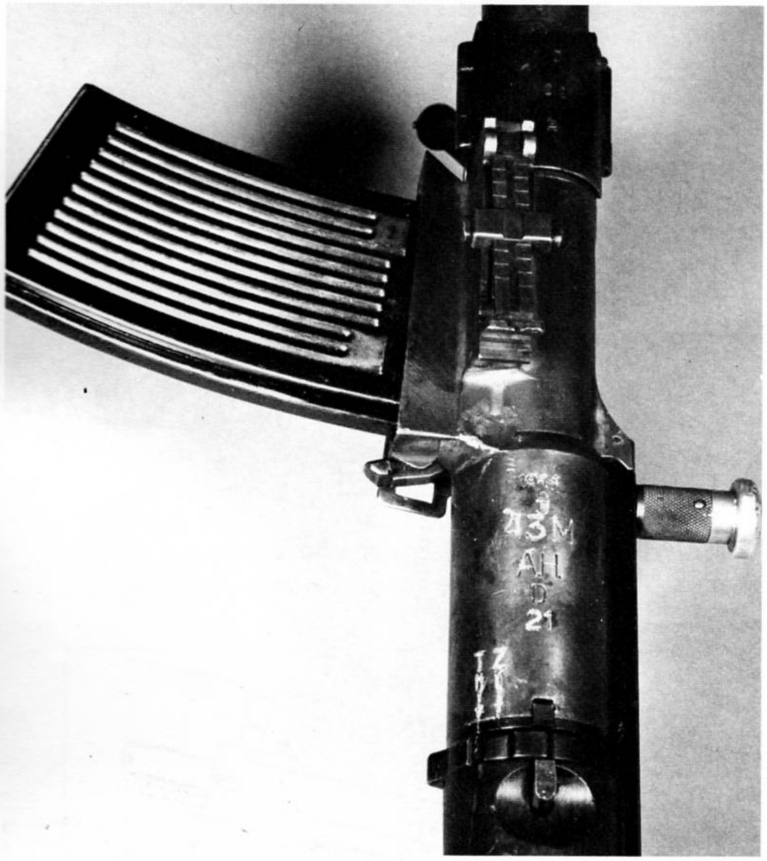
1. The stamped-metal Rheinmetall type 'A' LC-6 proposal, right side view, reproduced from an original sketch. The 'bulge' in front of the trigger guard is the housing for the spiral Lewis-type mainspring. Produced in model form only. Redrawn by Thomas B Dugelby

The Type 'A' – The First Design

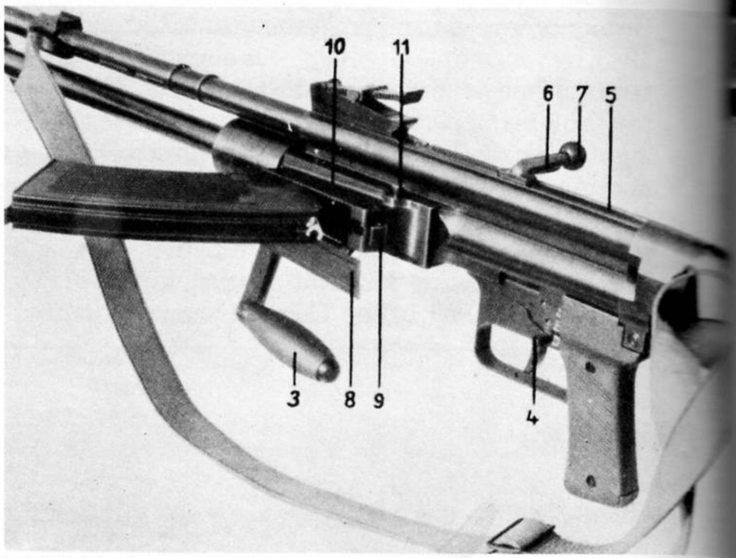
Rheinmetall was the first to submit a design proposal in response to the LC-6 specification, wherein the receiver, buttstock and corrugated handguard were all to be fabricated from pressed sheet metal. A stamped metal bipod folded down from a fixed swivel bearing at the muzzle end of the barrel. The proposed system of operation was pragmatic in the extreme, for, rather than wasting precious time and expense on an brand-new design, the type 'A' Rheinmetall mechanism was virtually identical to that of the World War I Lewis light machine gun (a weapon much admired by the Germans during that conflict), featuring a rigid gas piston/operating rod mounted beneath the barrel, cammed to a front-locking, rotating bolt and geared to a spiral (clock-type) recoil spring unit.

One basic departure from the design of the pan-fed Lewis gun was Rheinmetall's left-side-mounted box magazine feed system. This idea was no stranger to European ordnance, the main advantage being that it allowed a prone gunner to assume as low a profile as possible. Several existing weapons were so equipped: the German MG13, the Swiss Furrer and Italian Breda; the Austrian service M30 and its Hungarian counterparts the 31M (in calibre 8x56R) and the later 43M (in calibre 7.92mm Mauser); and the 7.92x57mm Knorr-Bremse model 35/36 machine gun. (The latter was adopted bearing code letters 'csm' by certain units of the SS in the early days of the Nazi era in Germany, the Army steadfastedly refusing at that point to allow the SS to bear German-issue service weapons. *

As shown in fig 141, late in the war Knorr-Bremse AG of Berlin-Lichtenberg also produced a prototype



2. Top view of the action of the Hungarian 43M light machine gun, calibre 7.92x57mm, showing the side-mounted MG13 magazine used with this model. The 43M and its forerunner the model 31M (calibre 8x56R) were, like the Austrian M30, simply different-calibred variants of the Solothurn S2-200 light machine gun, which was itself a derivative of the Rh 29, originally designed by Louis Stange at the Rheinmetall plant in Sömmerda. Photo courtesy Daniel D Musgrave



3. A left side closeup view of the action of the 7.92x57mm Knorr-Bremse model 35/36 machine gun, in a photograph taken from the company's sales brochure. Note the hinged dust cover (8) below the side-mounted magazine, which again appears to be that of the German MG13. (A later Knorr-Bremse design, an enigmatic, late-war assault rifle which appears to satisfy some of the Luftwaffe LC-6 requirements, appears in fig 141). Photo courtesy Daniel D Musgrave

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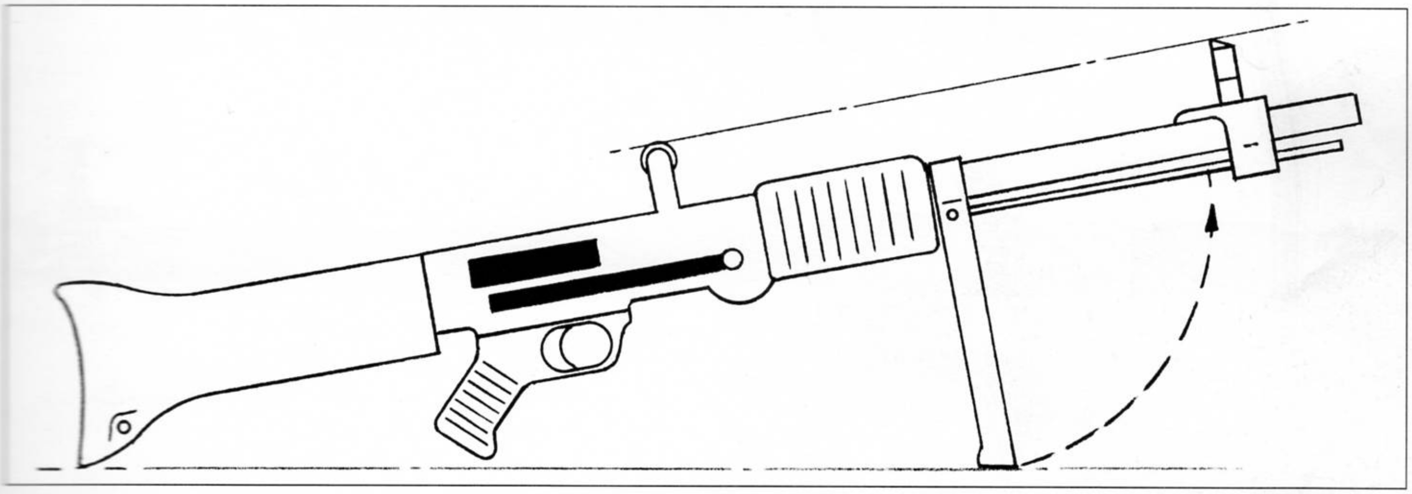
* For more information on this subject see the 1986 Collector Grade book *The Bren Gun Saga* by Thomas B Dugelby.

assault rifle which appears to satisfy at least some of the requirements of the Luftwaffe LC-6 specification, but nothing became of it.

Although the Rheinmetall type 'A' never proceeded beyond the model stage the concepts that it embodied, notably the front-locking turnbolt system and the side-mounted magazine, were adjudged superior to those of the Kreighoff proposal (which has been described as a gas-operated design with a vertically-sliding breechblock), and the Rheinmetall type 'A' was retained for further development.

The Type 'B' – Still at the Model Stage



4. The Rheinmetall type 'B' LC-6 proposal, right side view, reproduced from an original sketch. Compare with fig 1: note the modified buttstock, rear sight, and the relocation of the bipod to the mid-barrel position. Produced in model form only.

Redrawn by Thomas B Dugelby

With the the basic characteristics of the type 'A' LC-6 accepted, the first modifications and enhancements were begun. The original Rheinmetall design had specified a smooth, stamped sheet metal buttstock and this was retained, but the corrugated sheet-metal handguard was changed to one of resin-impregnated fibre to provide more insulation and resistance to slippage when wet. The bipod mounting point was moved back to the mid-barrel position in an attempt to enhance fire control, and the rear sight was altered. As with the type 'A', this design apparently existed only as a single model.

The Rheinmetall Type 'C'

The staff of GL/C-E6 was hesitant about proceeding with the radical sheet-metal Rheinmetall design, even though some 'user' elements in the Luftwaffe were eager to begin series production immediately. However, Rheinmetall's famous gun designer Louis Stange was known to be nearing completion of a modified, machined-receiver version of the company's first LC-6 submission, and with Stange's reputation for excellence in weapons design preceding him, it was decided to view his latest proposal before any final commitment was made.

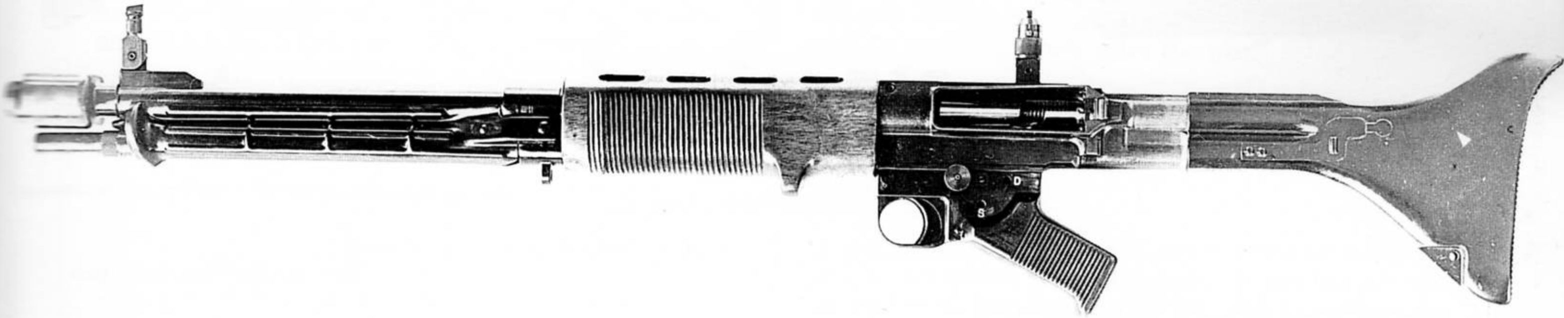
Stange's reputation was indeed so high, and his modified LC-6 design by this time so far advanced, that speculation arose concerning its becoming the general-issue service weapon after its final refinement. When the first firing model was actually completed and presented, therefore, GL/C-E6 felt duty-bound to acquaint the Army Ordnance testing station at Kummersdorf with Stange's accomplishment.

The Army Ordnance experts, who had originally scoffed at the Luftwaffe's assault rifle idea, were astounded. Never before had such a radically specialised weapon been conceived and designed, let alone produced without any Army Ordnance input whatsoever, and then fired successfully, all in so short a time! A concentrated test programme was immediately begun, during which Stange's model was fired to destruction in just a few days. This original gun was returned to Rheinmetall in pieces, along with the data derived from the tests, which enabled Stange to concentrate on strengthening the components which had failed. A second, stronger model was soon produced, and the firing trials continued. This process of 'trial-and-feedback' happened several times in quick succession, with Rheinmetall staging frequent demonstrations of the latest iteration of the weapon as it developed. The result was the unveiling of the forerunner of what is generally known today as the 'early' FG42 in April of 1942. The first three toolroom models were delivered two months later.

Chapter Three

Prelude to Production

Description of the LC-6 Type 'C'



5. Left side view of the earliest-known type 'C' LC-6, designed for Rheinmetall by Louis Stange. The initial three toolroom models of the type 'C' LC-6 were delivered in the summer of 1942. Note the first appearance of the radically 'swept-back' handgrip, designed to facilitate firing the weapon whilst still descending in a parachute, and the smooth aluminum buttstock. Photo courtesy George Petersen

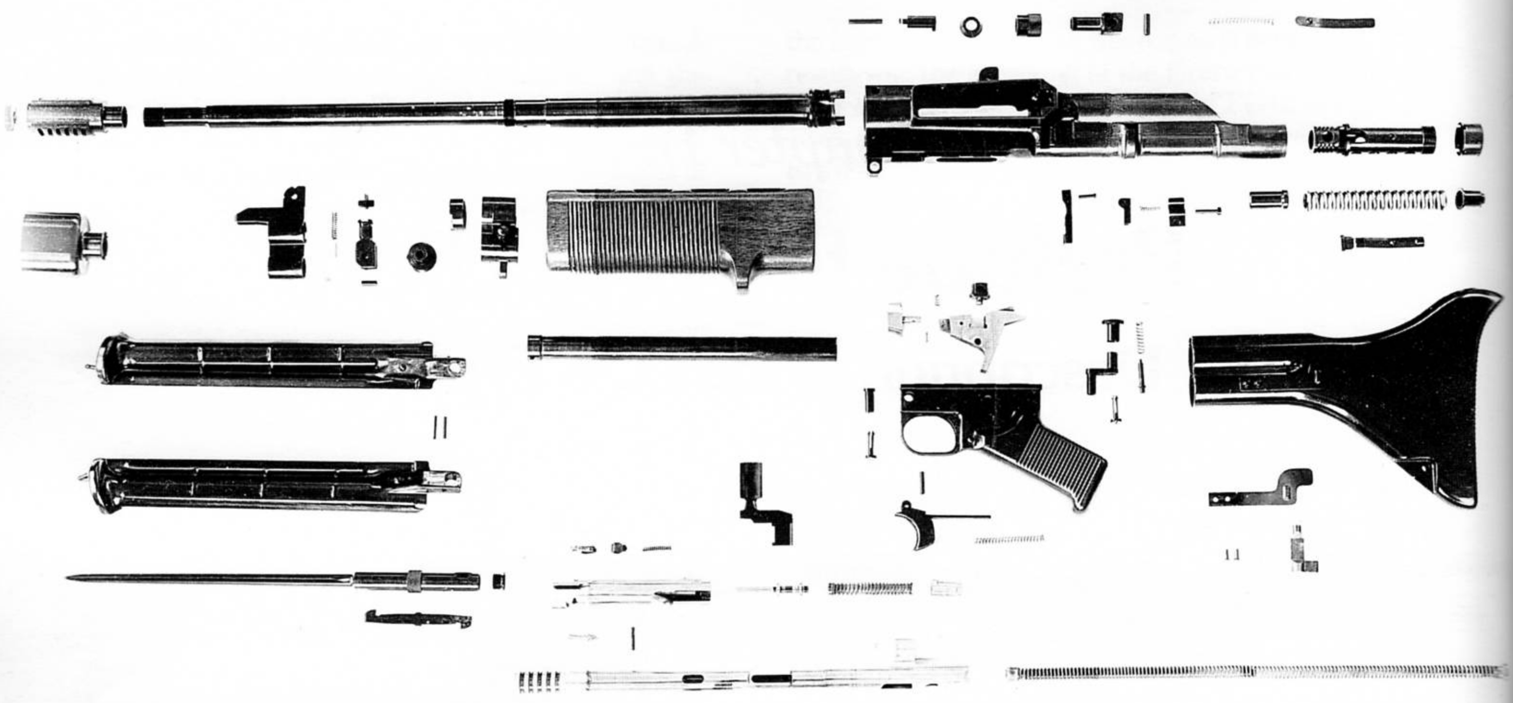
The Rheinmetall type 'C', the forerunner of the 'early' production series, featured an intricately machined receiver and a reinforced wooden handguard. To counteract the heavy recoil of the standard 7.92mm service cartridge in such a comparatively light weapon, especially during automatic fire, Stange had masterfully 'floated' the entire weapon, by means of a spring-loaded buffer, within a redesigned (though still smooth) sheet-aluminum buttstock, and added an efficient two-piece combination muzzle brake and flash hider. The folding bipod was retained at the mid-barrel location, but the Lewis-type spiral mainspring of the types 'A' and 'B' gave way to a captive conventional compression spring-and-rod assembly, housed within the hollowed-out rear section of the gas piston.

The radically swept-back sheet-metal handgrip, easily the most recognisable trademark of the 'early' production version, was attached to the receiver by a split-pin/bushing similar to those found on the MG34 and MG42. The safety/fire selector lever was configured as a single assembly. Both the spring-loaded buttstock and the handgrip/trigger guard were stamped in two halves and butt-welded together, then smooth-finished so that no seam was visible. The entire weapon was then given a commercial-style black-blue finish, with the aluminum components painted black.

Calibre Standardisation in the Luftwaffe

As trials with the toolroom models continued, further improvements were suggested and various sighting systems were tried out. Gun no 15, which would appear to be the perfected prototype, featured a short-lived, 5-position rotary backsight mounted on the forward portion of the receiver, and a new, one-piece muzzle brake.

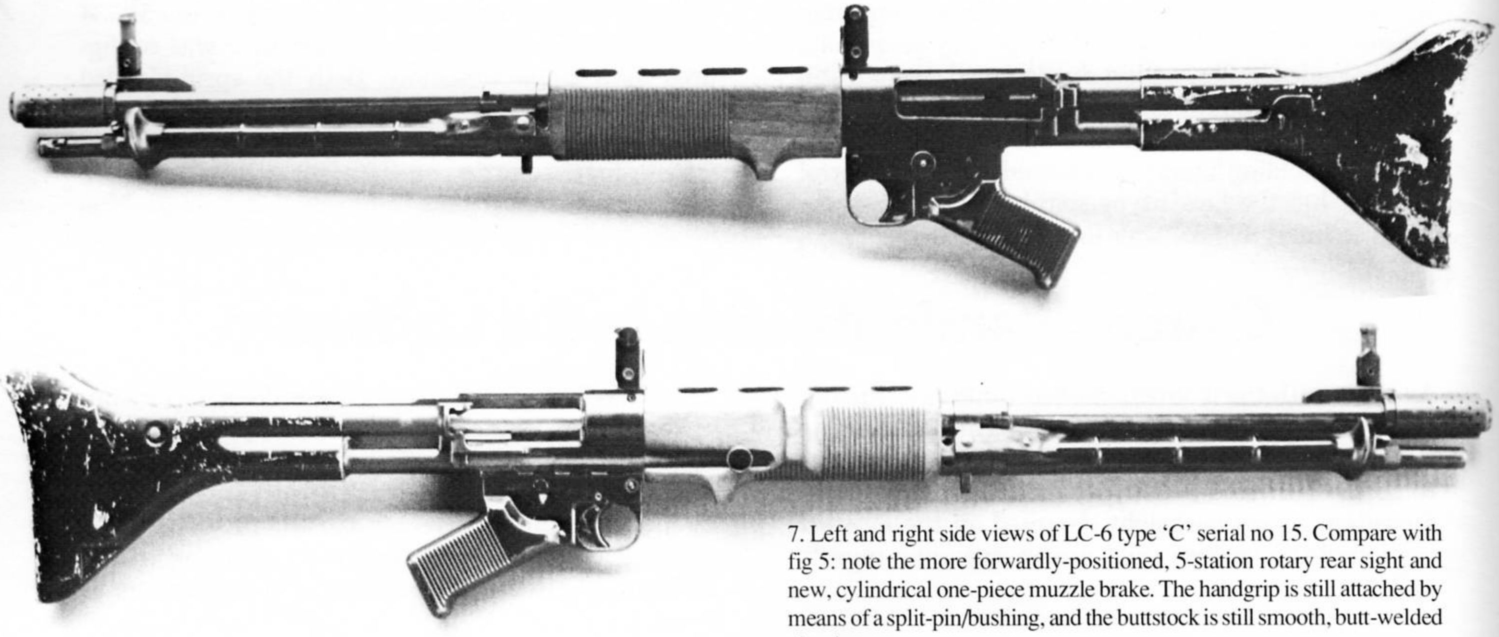
The German Army had standardised its 7.92mm service calibre years before, but for the previous three or four years the Luftwaffe had been experimenting with various calibres between 7.88 and 7.92mm in an attempt to improve barrel life and accuracy. (Even the Army itself had recently been experimenting with a 7.88mm calibre round, featuring a 3mm increase in



6. Left side disassembled view of the type 'C' LC-6 featured in fig 5. Note (from left) the wide, bottle-shaped flash eliminator of the early two-piece muzzle brake, and the split-pin/bushing arrangement for attaching the handgrip unit to the receiver,

Photo courtesy George Petersen

bullet length). However, the Rheinmetall type 'C' assault rifle, then still known only by its specification number as the 'LC-6', was nearing a state of completion and the Project Manager, Otto Shulze, wisely voiced the opinion that the time had come to standardise on calibre before any series production of the LC-6 was begun. In the face of the eleven million rounds of standard 7.92mm service ammunition being produced daily throughout the Greater German *Reich* the most practical course was obvious, and the Luftwaffe soon settled on the standard 7.92x57mm round for all production versions of the FG42.



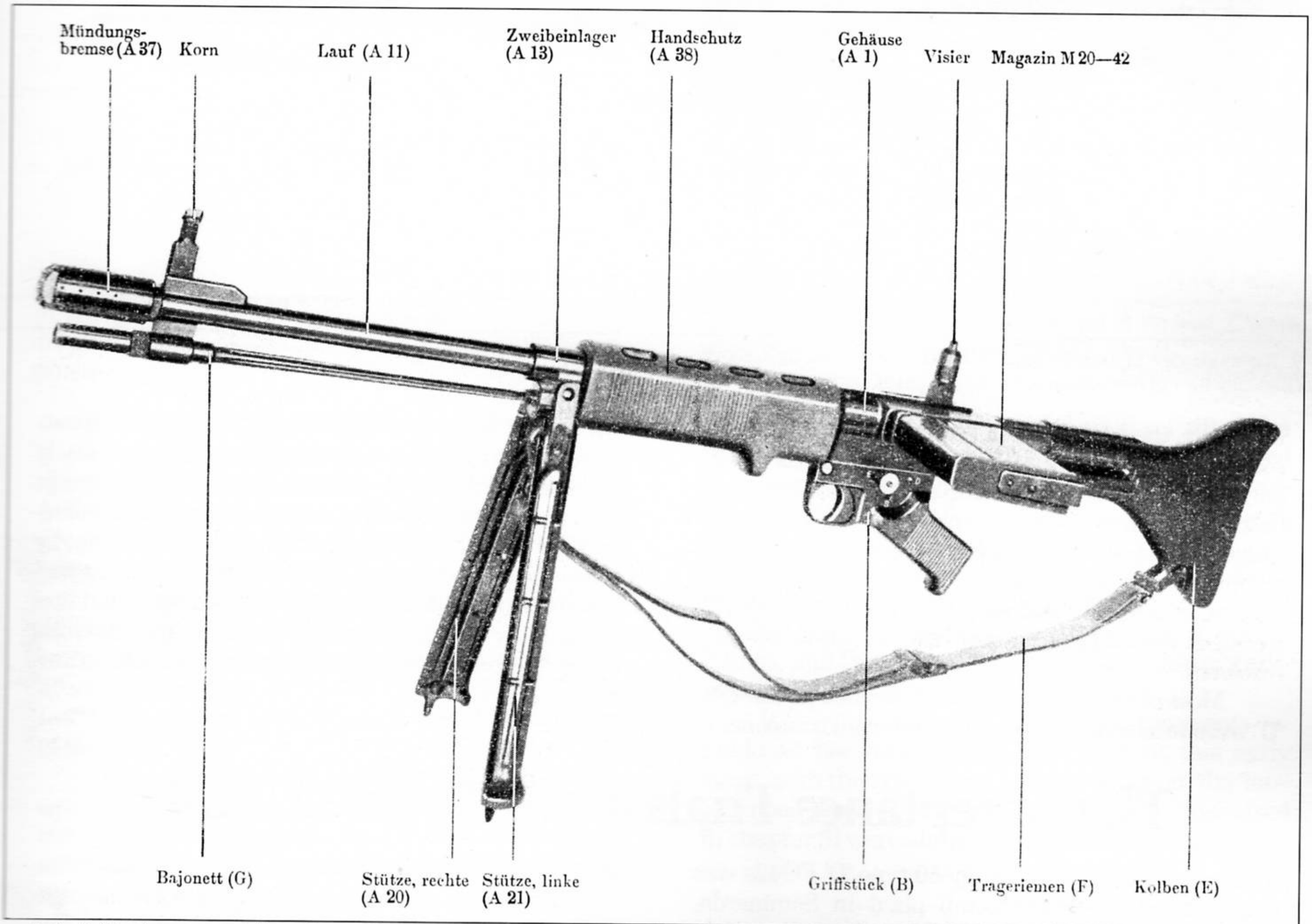
7. Left and right side views of LC-6 type 'C' serial no 15. Compare with fig 5: note the more forwardly-positioned, 5-station rotary rear sight and new, cylindrical one-piece muzzle brake. The handgrip is still attached by means of a split-pin/bushing, and the buttstock is still smooth, butt-welded aluminum.

Dr Geoffrey Sturgess collection, photo by Thomas B Dugelby

Hitler Christens the FG42

A long-simmering battle of wills came to a decisive head after the first 50 type 'C' weapons had successfully passed proof. On the very brink of success, Hitler's objection to the whole project remained adamant; especially when, after a demonstration at Saarbrucken, it was announced that the LC-6 was to be issued "exclusively to the paratroops."

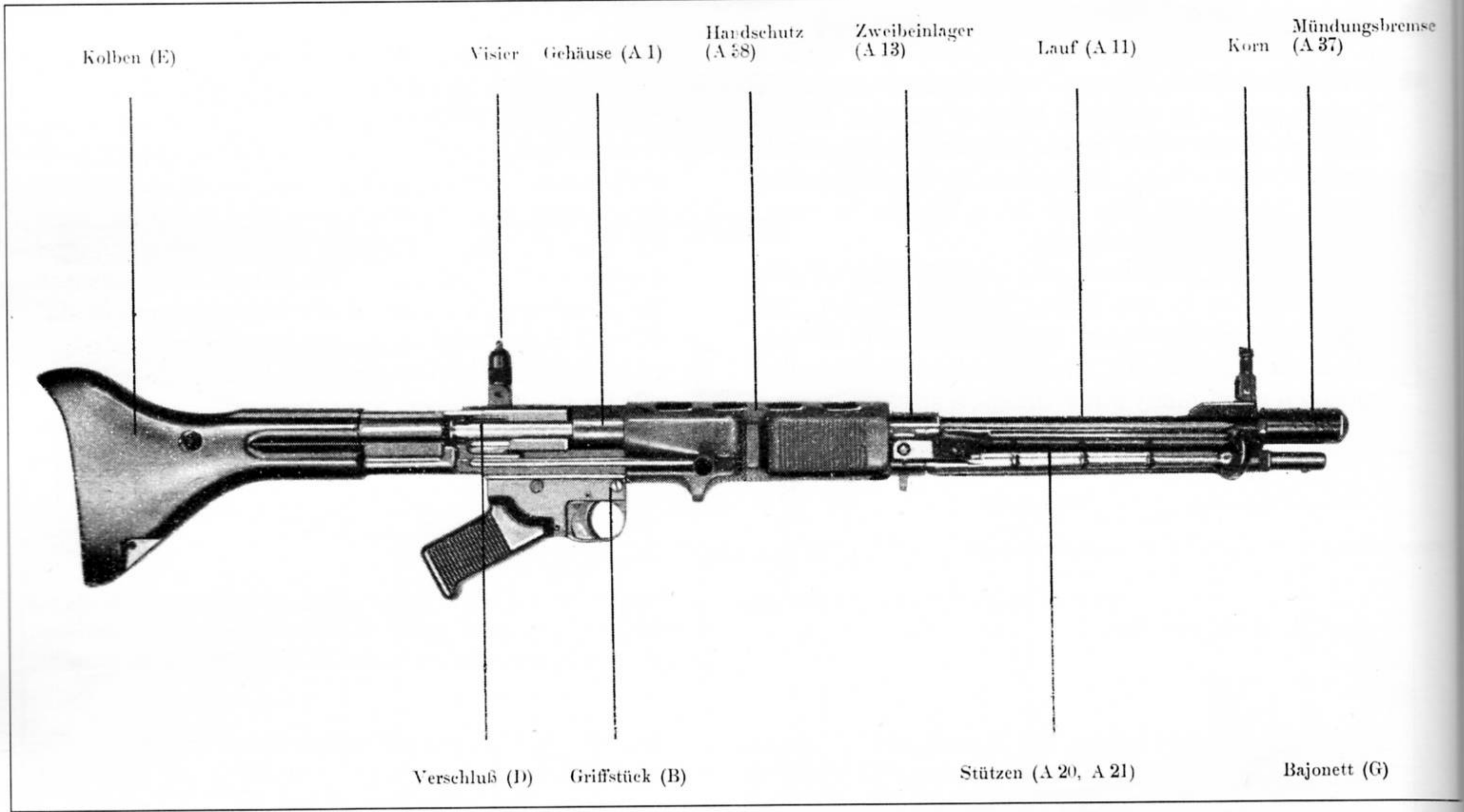
However, as related in a series of 1970 *Waffen Revue* articles by the former Rheinmetall engineer Hans-Joachim Kaltmann, fate intervened in the person of Hermann Göring, who coincidentally controlled, among a great many other things, a sizeable 'piece of the action' at Krieghoff. In December of 1942 Göring had been presented with a final prototype of the LC-6 type 'C' as a Christmas present. With a flourish, he re-presented it to Hitler, whose interest was immediately re-kindled. Göring then adroitly arranged a firing demonstration and, after both he and Hitler had fired the weapon, the mercurical Führer praised it and decreed on the spot that it should indeed be issued to the paratroopers as the *"Fallschirmjägergewehr 42"* (FG42). Hitler went on to envisage the production of 100,000 FG42s, enthusing: "This will be the standard rifle for the *Wehrmacht* after the war!"



8. Left side three-quarter view of an early type 'D' FG42, with bipod folded down and sling attached. This picture originally appeared as fig 3 in the first edition of the FG42 Weapon Handbook D. (Luft) T.6194, published in July of 1943. (A translation of this manual, using the original German part identifier codes, appears in chapter four).

Courtesy James Alley

The Type 'D' – The First *Fallschirmjägergewehr*



9. Right side view of the same type 'D' FG42 as featured in fig 8, above. Originally fig 1 in first edition of D. (Luft) T. 6194 (reprinted in chapter four, below). Note the smooth aluminum buttstock.

Courtesy James Alley

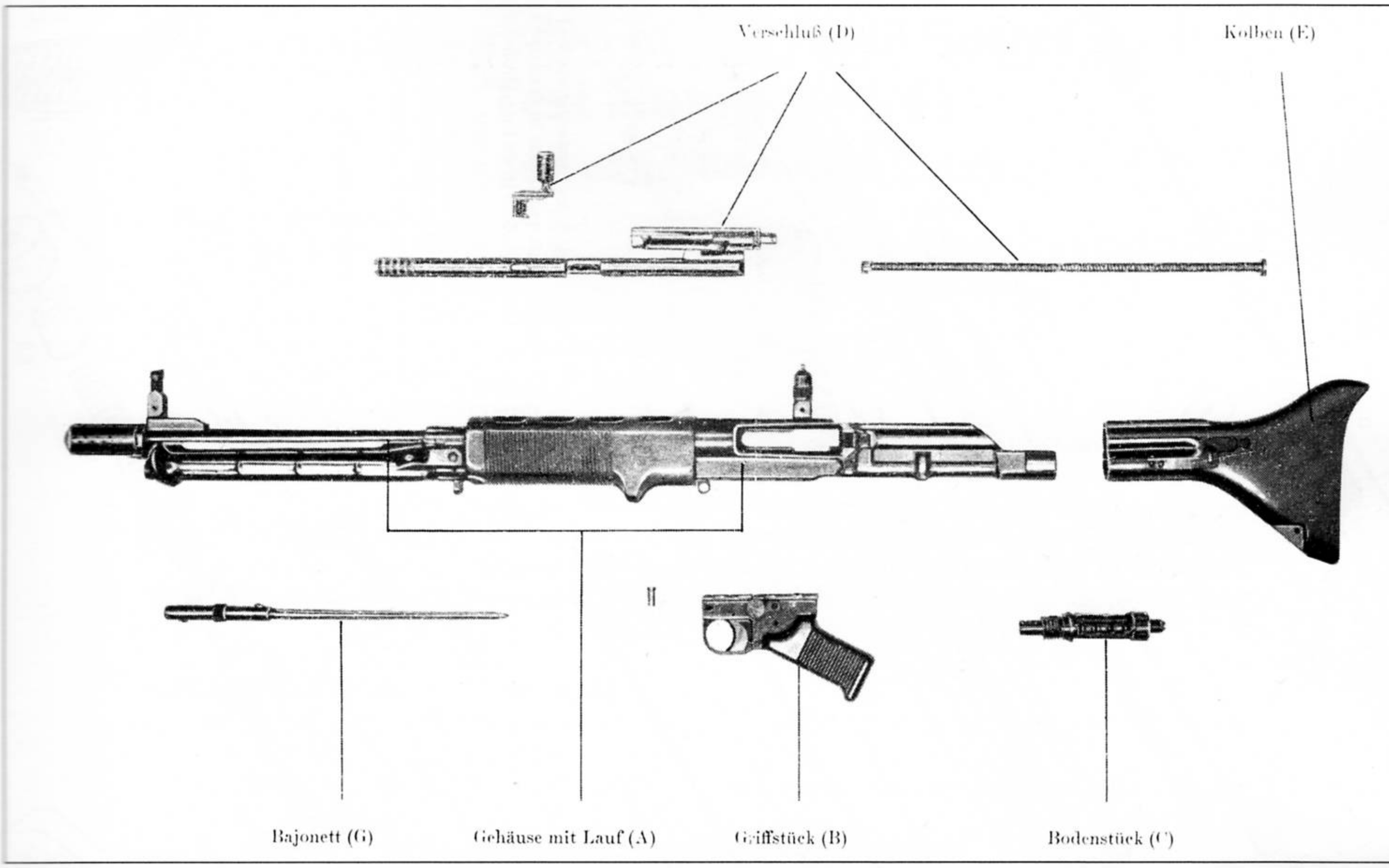
Ironically, the newly-christened FG42 had vaulted the seemingly supreme hurdle of the Führer's acceptance only to face an even more important trial: the incessant battle of wits needed to triumph over the grimly pragmatic LC-6 specification, which in essence demanded the impossible: a light but robust automatic weapon capable of reliable, accurate, long-range lethality. (As we shall see, this dichotomy was never to be fully resolved).

Most of the improvements embodied in the type 'D' were intended to strengthen internal components which had failed during previous firing trials. In outward appearance, therefore, the type 'D' very closely resembled its immediate forerunner the type 'C', except for a new, improved round muzzle brake and a beefed-up method of retaining the still-slanted handgrip, by means of a solid pin held in position by a flat spring-steel retaining plate. The multi-reticule rear sight was replaced by a single peephole in a flip-up post, while the spring-buffered buttstock remained smooth aluminum.

The Acceptance Trials of the Type 'D' FG42

A test series of approximately 50 type 'D' FG42s was made up by the Rheinmetall plant in Sömmerda, following which a three-month series of gruelling trials was conducted at the Luftwaffe testing station at Tarnewitz from 24 February to 16 April, 1943. This was the final, all-out attempt to wring all the 'bugs' out of the FG42 design before series production began, and was thus a most crucial event.

Under the date of 2 July, 1943, the *Erprobungsstelle der Luftwaffe* (Luftwaffe Test Facility) at Tarnewitz issued an extensive report of the trials entitled "Report No E6/17776/43 Secret, Test Number 31/43", which is excerpted in detail below. In addition to establishing the actual endurance limits of the



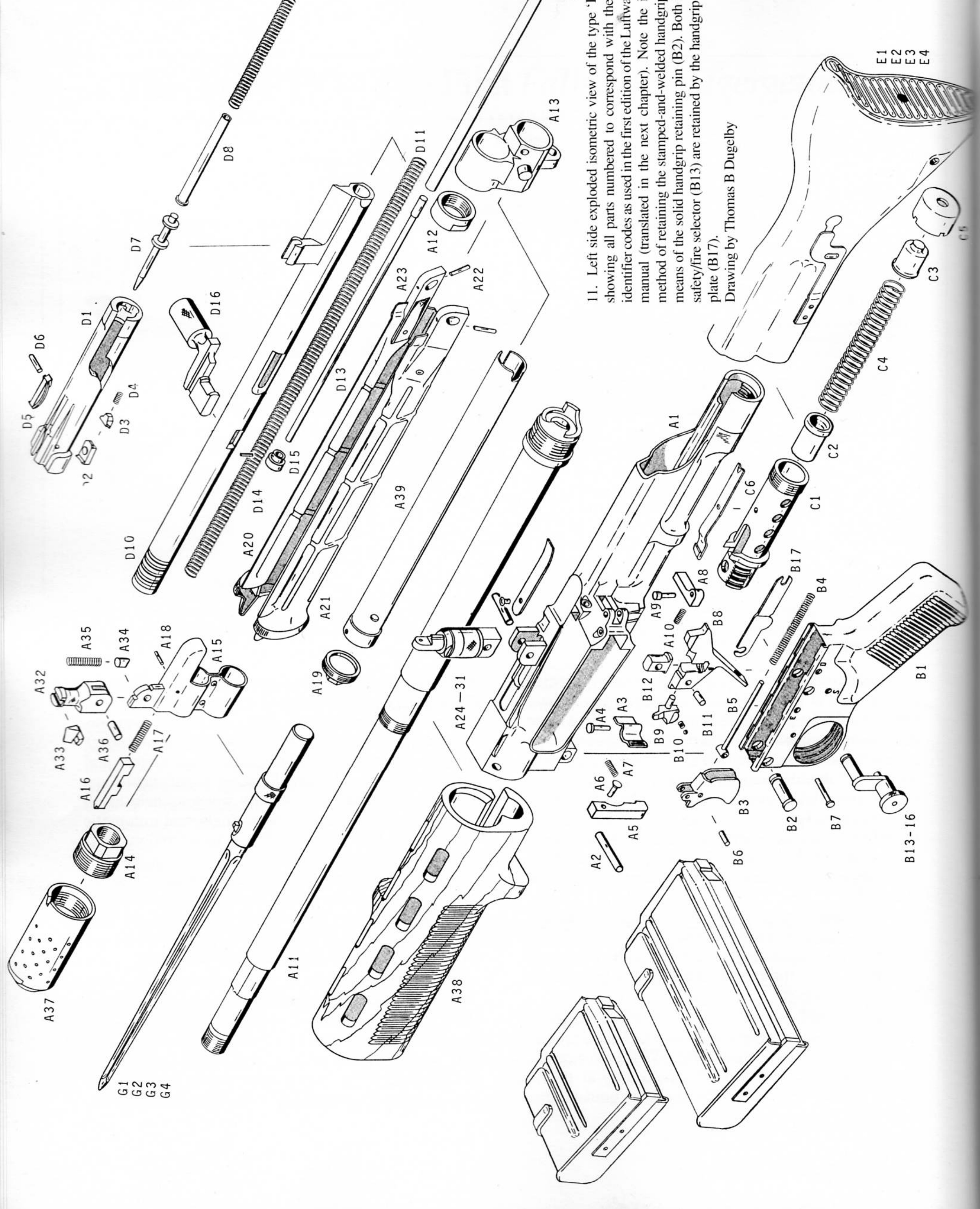
10. Left side view of the type 'D' FG42 featured in figs 8 and 9, field stripped. Originally fig 5 in the first edition of D. (Luft) T.6194. Note the redesigned solid pin used to attach the handgrip to the receiver. As noted in the accompanying text, the single split pin of the type 'C'proved unsatisfactorily weak and was redesigned in the type 'D'.
Courtesy James Alley

weapon's component parts, the trials report presented a great deal of meaningful data concerning the handling, reliability, and accuracy of the FG42, both alone and when fitted with enhanced sighting systems and grenade launchers, prototypes of several designs of which had already been developed.

During the course of the trials, six brand new type 'D' guns, serial nos 023, 024, 025, 036, 037 and 038, were fired a total of nearly 100,000 rounds in temperatures varying from -60 to +70° Celsius. Several of the test weapons were literally torn to pieces in the course of the trial.

To accomplish this punishing firing schedule as quickly as possible, each gun was fired in alternating strings of 50 rounds single fire followed by 50 rounds automatic, with the barrel cooled by compressed air between relays. The ammunition used constituted a thorough mix of all the types likely to be encountered in combat, including both steel- and brass-cased versions of standard ball (sS; *schweres Spitzgeschoss*), armour piercing (SmK; *Spitzgeschoss mit Kern*) and tracer (lS-L-spur; *leichtes Spitzgeschoss-Leuchtspur*). Firing was performed with the weapons held in all possible positions during both single and automatic strings, and the muzzle flash was measured in darkness in single and sustained fire.

It is noteworthy that some of the comments reproduced hereunder reveal that even at this early stage, with the type 'E' not yet in production, the 'late' (stamped-receiver) types 'F' and 'G' FG42s (discussed in chapter 5) were already under development.



11. Left side exploded isometric view of the type 'D' FG42, showing all parts numbered to correspond with the German identifier codes as used in the first edition of the Luftwaffe FG42 manual (translated in the next chapter). Note the improved method of retaining the stamped-and-welded handgrip (B1) by means of the solid handgrip retaining pin (B2). Both it and the safety/fire selector (B13) are retained by the handgrip retaining plate (B17).
Drawing by Thomas B Dugelby

Report No E6/17776/43 Secret
Test Number 31/43

Conduct of the Endurance Trials

FG42 no 023: total rounds fired 10,419

Rounds fired	*Malfunction*
2,000	weak magazine spring - magazine fell out during shooting
2,780	handgrip guide rib broken
5,290	firing pin spring broken
6,300	trigger function irregular
7,000	ejector broken
8,155	handgrip loose; trigger replaced; incomplete locking of mechanism
10,200	interruptor broken At this point operational reliability of the trigger could no longer be obtained despite the replacement of trigger assembly components within the handgrip. Firing was terminated and the weapon was returned to Rheinmetall, where examination revealed that both handgrip attachment supports within the receiver had broken.

FG42 no 024: total rounds fired 20,165

Rounds fired	*Malfunction*
1,900	sear pivot broken
2,400	safety/fire selector broken; retaining spring fell out; capable of semi-auto fire only
3,384	firing pin spring broken and wrapped around itself
6,288	safety/fire selector broken at round #3,827; trigger function irregular
6,600	trigger guard in handgrip twisted; holes in handgrip oversize (deformed) thus allowing too much play in trigger
7,382	handgrip retaining spring broken
9,640	safety/fire selector broken, having fractured at round #3,940
10,440	mainspring guide rod broken in front of rivet
14,000	cocking handle broken
14,950	safety/fire selector spring broken after 5,310 rounds; cocking handle broken after 1,081 rounds
15,000	firing pin yoke on gas piston extension broken; extractor, spring and compression piece broken
16,000	15% keyholing observed on the target
17,125	interruptor and pivot pins broken; firing pin broken; firing pin spring broken after 13,610 rounds
18,145	safety/fire selector broken after 13,610 rounds; 70% keyholing observed on the target
19,000	end flange of mainspring guide broken

FG42 no 025: total rounds fired 18,000

Rounds fired	*Malfunction*
2,800	firing pin spring broken; stronger spring and guide recommended
3,500	receiver magazine opening deformed
4,700	bolt stop and gas piston extension guides worn out
5,500	firing pin spring retainer bushing broken as a result of weakening of firing pin spring; misfire in semi-automatic fire
6,100	new firing pin spring retainer bushing design recommended

7,200	flange on firing pin spring guide rod sheared off; forearm broken
7,500	bolt stop pin fell out; stop worn out; mainspring twisted around itself; many misfires; mainspring ceased to function
8,100	firing pin spring broken after 5,300 rounds
8,900	hole in handgrip for safety catch deformed; trigger function irregular
9,400	mainspring guide seized due to deformed edge, edge removed
10,000	bolt stop and gas piston guides worn out
11,230	mainspring broken
12,400	safety/fire selector spring broken
12,600	firing pin yoke on gas piston extension broken; firing pin spring broken after 5,100 rounds
13,200	ejector broken; firing pin spring retainer bushing useless after 7,100 rounds; ejector actuator damaged
13,800	bolt stop broken after 1,200 rounds; bolt fractured at cam opening; flange on firing pin spring retainer broken
13,900	muzzle brake damaged giving 90% keyholing; forearm damaged at front
14,500	firing pin spring deformed after 1,800 rounds; safety/fire selector spring broken after 2,700 rounds
15,900	safety/fire selector broken
16,140	firing pin point broken after 1,640 rounds; firing pin hole in bolt deformed causing deformation in firing pin
17,500	firing pin spring broken after 3,600 rounds; safety/fire selector replaced after sleeve broke off; safety lever broke again after 50 rounds; ejector actuator broken again after 4,150 rounds; ejector also broken again after 310 rounds
17,900	ejector actuator again broken after 200 rounds
	Trigger malfunctions and progressively more defects developed with continued firing; firing was consequently terminated.

FG42 no 036: total rounds fired 20,370

Round fired	*Malfunction*
3,300	firing pin spring broken; magazine catch spring broken; magazine fell out during shooting
6,400	bolt stop pin fell out, not properly secured
6,900	firing pin spring broken
7,100	firing pin yoke on gas piston extension broken; bolt stop broken
9,500	trigger in single shot mode gave double shots
10,400	trigger refused to function due to deformed firing pin spring
11,500	no effect observed when shifted from single to automatic fire
12,000	permanent setback in mainspring
13,000	safety/fire selector broken
14,000	safety/fire selector broken again after 1,000 rounds
15,800	feed horns on bolt broken
16,500	trigger position in single shot position gave double shots
18,100	firing pin yoke on gas piston extension broken after 11,000 rounds
19,000	10% keyholing observed; ejector broken

FG42 no 037: total rounds fired 20,275

Rounds fired	*Malfunction*
4,000	irregular feeding due to loose magazine
5,000	firing pin spring broken
8,500	mainspring broken due to weak firing pin spring
10,200	trigger fell out due to damaged pin; firing pin spring broke after 6,000 rounds
10,500	safety/fire selector broken

11,000	safety/fire selector broken again after 1,077 rounds; gas port restricted due to carbon buildup
12,800	mainspring wound around itself; firing pin, spring and mainspring unserviceable
13,000	cocking handle broken
13,700	ejector broken
14,000	handgrip and trigger pins damaged
16,000	firing pin spring broken after 4,000 rounds
17,000	ejector and actuator again broken after 1,000 rounds
18,000	ejector and actuator again broken after 1,000 rounds; also firing pin spring
19,000	edge of firing pin spring retainer broken; 50% keyholing observed

FG42 no 038: total rounds fired 2,100

Rounds fired	*Malfunction*
2,100	barrel cam bolt guide broken; no further shooting.

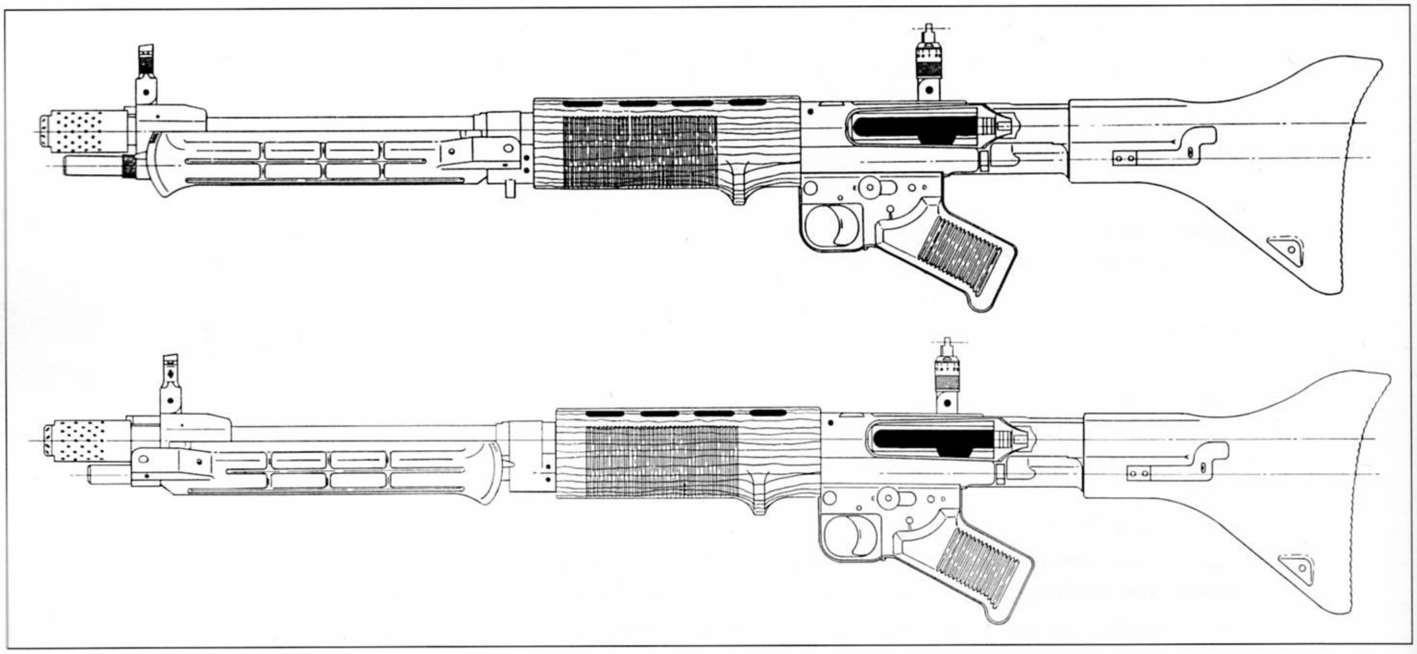
Projected Parts Replacement List

The following list of replacement parts would be necessary to support a platoon with 30 weapons, based on the frequency of parts breakages during the endurance trial:

Nomenclature	**Required stockage**
firing pin spring assembly	60
bolt stop	40
ejector	30
interruptor	30
interruptor pin	30
interruptor spring	30
safety/fire selector	30
buttstock lock spring	20
ejector stop	20
magazine catch spring	20
magazine catch pin	20
pin retaining spring	20
sear pivot	20
firing pin	10
ejector pin	10
ejector stop pivot pin	10
bolt stop spring	10
bolt stop pin	10
handgrip retaining pins	10
handgrip	10
buttstock retaining catch	5
extractor	5
extractor compression piece	5
extractor spring	5
compression piece spring	5
magazine catch	5
trigger	5
trigger spring	5
trigger spring guide	5
rear sight leaf spring	5

rear sight spiral spring	5
rear sight axis pin	5
front sight lock spring	5
front sight axis pin	5
muzzle brake lock	5
muzzle brake lock spring	5
gas cylinder plug	5
gas piston extension	3
mainspring guide button	3
mainspring	3
gas cylinder	3

Accuracy of Fire with Centre Bipod, Front Bipod and Sandbag Support



12.. Drawings of two trials model type 'D' FG42s with different bipod mounting positions, as used in the Tarnewitz 'Accuracy of Fire' trial.
Above: left side view of weapon with standard (centre) bipod support.

Below: left side view of weapon with experimental front bipod support. As noted in the accompanying text, the centre bipod support was adjudged the better and was retained in the early production (type 'E') weapon.

Drawings by Thomas B Dugelby

Hit patterns were fired in single and sustained fire with middle bipod, front bipod and sandbag support up to ranges of 800 metres. Because of wind conditions and a lack of sufficiently large targets, meaningful data could not be obtained for firings over 300 metres, although analysis of the following indicates that no critical deviations are anticipated at longer ranges:

Rounds	Type of fire	Range (m)	Support	No of hits	Dispersion (HxW) (cm)	
7	SA	100	centre	7	28	42
7	SA	100	front	7	13	13
7	SA	100	sandbag	7	10	7
40	FA	100	centre	39	80	93
40	FA	100	front	40	67	54
40	FA	100	sandbag	39	89	64

7	SA	200	centre	7	28	42
7	SA	200	front	7	30	28
7	SA	200	sandbag	7	27	15
40	FA	200	centre	27	89	94
40	FA	200	front	28	103	64
40	FA	200	sandbag	22	112	77
7	SA	300	centre	7	29	31
7	SA	300	front	7	31	41
7	SA	300	sandbag	7	53	40
40	FA	300	centre	20	120	133
40	FA	300	front	19	85	105
40	FA	300	sandbag	29	140	138

Single fire from the various supports showed only slight deviation, as each shot could be carefully aimed. In automatic fire, either bipod position gave better results than the sandbag rest, although the following factors tend to favour the centre support:

a. Front bipod support

The dispersion of each single burst was patterned relatively close together, although in tracking a laterally moving target the gunner must either lift the weapon or change his position. The traversing range in elevation is approximately 15 degrees less than with centre bipod support, which has an adverse effect upon aiming with the rifle grenade sight.

In this position the bipod folds backward, which means that the weapon tends to fall forward easily with the muzzle into the sand when the gunner is assuming the firing position, changing magazines, or firing.

Controlling the weapon with pressure from the shoulder, both to obtain the greatest possible accuracy and to support the greater recoil of firing rifle grenades, is impossible.

b. Centre bipod support

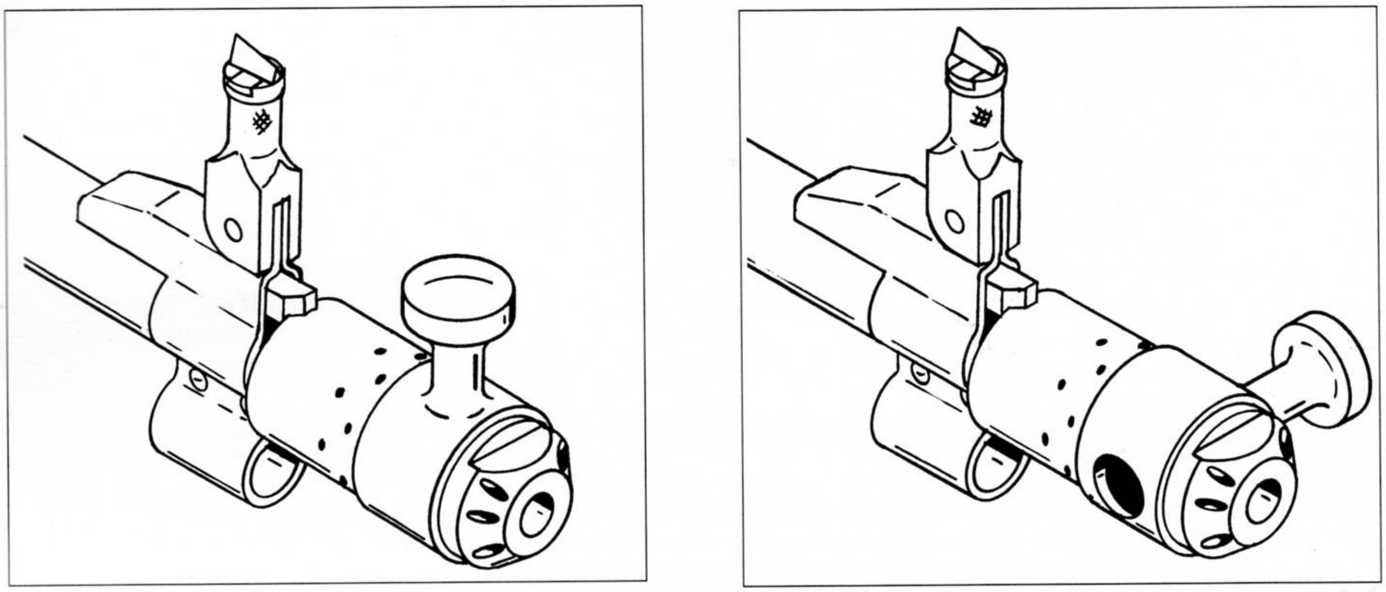
The dispersion pattern in automatic fire was generally greater, but the accuracy for head targets at 100 metres and for breast targets at 200 metres was regarded as quite adequate.

This position offers the greatest degree of lateral mobility against moving targets, and operability of the weapon in combat is good. The weapon can be supported solidly with the shoulder, allowing the gunner to obtain very tight bursts and acceptable dispersion.

However, in the carrying position with centre bipod support folded the FG42 is unbalanced; i.e. the muzzle portion pulls the weapon downwards. This problem does not apply with the front bipod support. Also, extending the bipod from the centre position is difficult when the barrel is hot.

The Tarnewitz Experimental Muzzle Brake/Compensator

In burst fire from the hip to the left or right, it was evidenced that the lateral dispersion drifted pronouncedly from shot to shot. In an effort to counterract this the Tarnewitz team produced an experimental adjustable muzzle brake/compensator consisting of a sleeve, fixed to the barrel of a regular muzzle brake, with a 12mm hole opposing a large control knob. This could be rotated to position the hole horizontally to mate with a similar hole drilled through the right side of the barrel of the muzzle brake, or turned off (down) for use with the bipod. In hip firing, the force and direction of the gases emerging from the large opening compensated for the moment of torque.



13. Two views of the experimental two-piece Tarnewitz muzzle brake compensator, a laudable but somewhat unwieldy device which attempted to tighten hit spread during burst fire by counterracting the natural tendency of the weapon to pull to the right. Not adopted in spite of impressive trial results obtained (see fig 14, below).
Left: sleeve turned to 'off' position, for use when firing prone off the bipod.

Right: sleeve rotated 90° to 'on' position, for use when standing and firing from the hip or shoulder. In this position the 12mm hole in the external sleeve was aligned with a similar hole drilled through the side of the muzzle brake itself. Drawings by Thomas B Dugelby

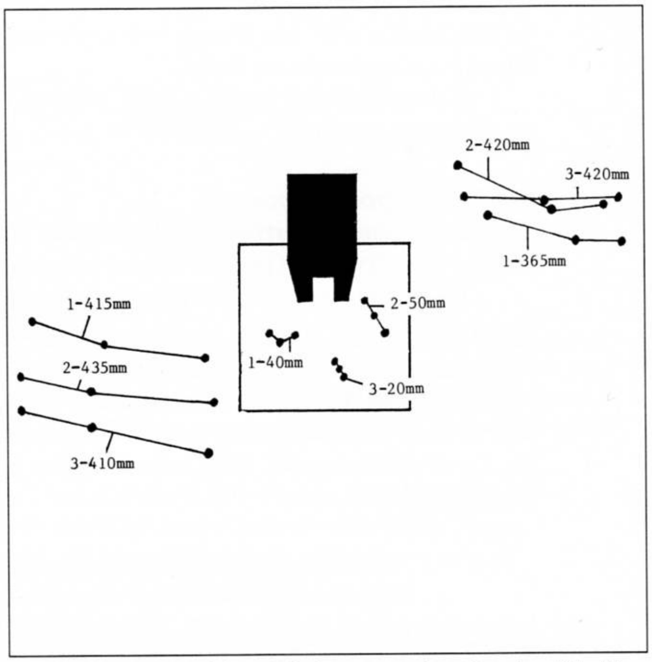
Sighting Equipment

a. (Diopter) Sight

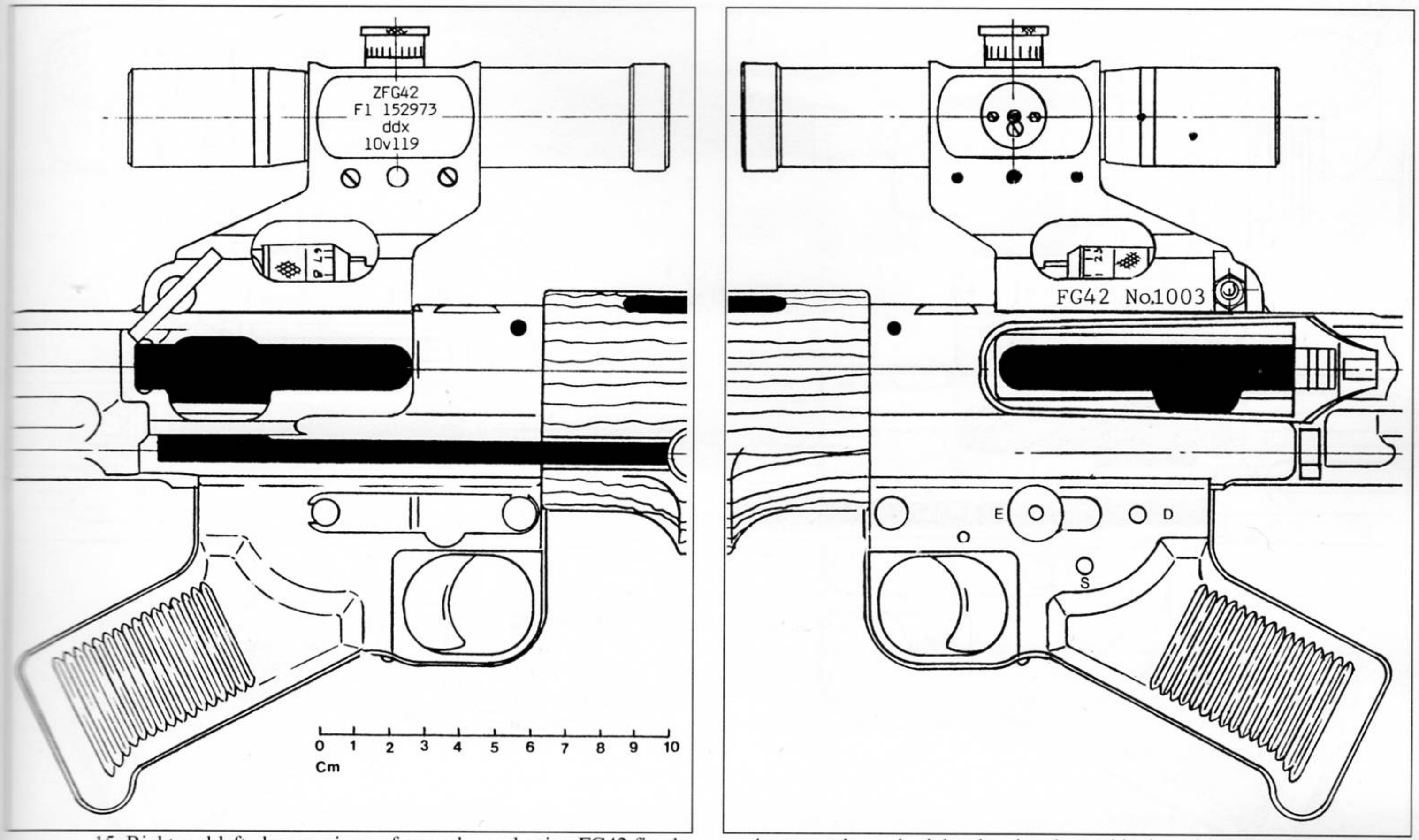
The diopter sight was tested under varying weather conditions and at various times of the day, during which two defects were evidenced. First, sunlight falling from behind the gunner reflects off the sight, illuminating the aperture and distorting the front sight post so that the target cannot be discerned. Sighting targets against a dark background is also difficult, for the same reason. Increasing the size of the sight aperture would reduce the defect, but the aiming error factor would thus be made greater.

b. ZFG42 Telescopic (Lensatic) Sight

[A 4-power lensatic sight with an erector lens providing a 5-degree field of view (the forerunner of the later-standard GwZF4) was developed for the FG42 by the Voigtländer company (code letters 'ddx'). Dubbed the 'ZFG42', it was mounted in a machined brass casting with the serial



14. A reproduction of the original target produced by the trial of the experimental Tarnewitz muzzle brake/compensator (fig 13), showing the results of three bursts of three shots each, all fired at a range of three metres.
Left group: normal muzzle brake. Average spread: 420mm (16 ½).
Centre group: Tarnewitz brake 'on'. Average spread: 37mm (1.5").
Right group: Tarnewitz brake 'off'. Average spread: 402mm (15.75").
Redrawn by Thomas B Dugelby



15. Right and left closeup views of an early production FG42 fitted with the final adopted version of the Voigtländer (code 'ddx') ZFG42 4-power telescopic sight, showing the positioning of the mount over the folded rear iron sight, and typical markings.

Drawings by Thomas B Dugelby

number of the rifle engraved onto the left-hand side of the mount. Each scope, along with a sun shade and two filters, came in a fitted wooden box which attached to the gunner's belt.]

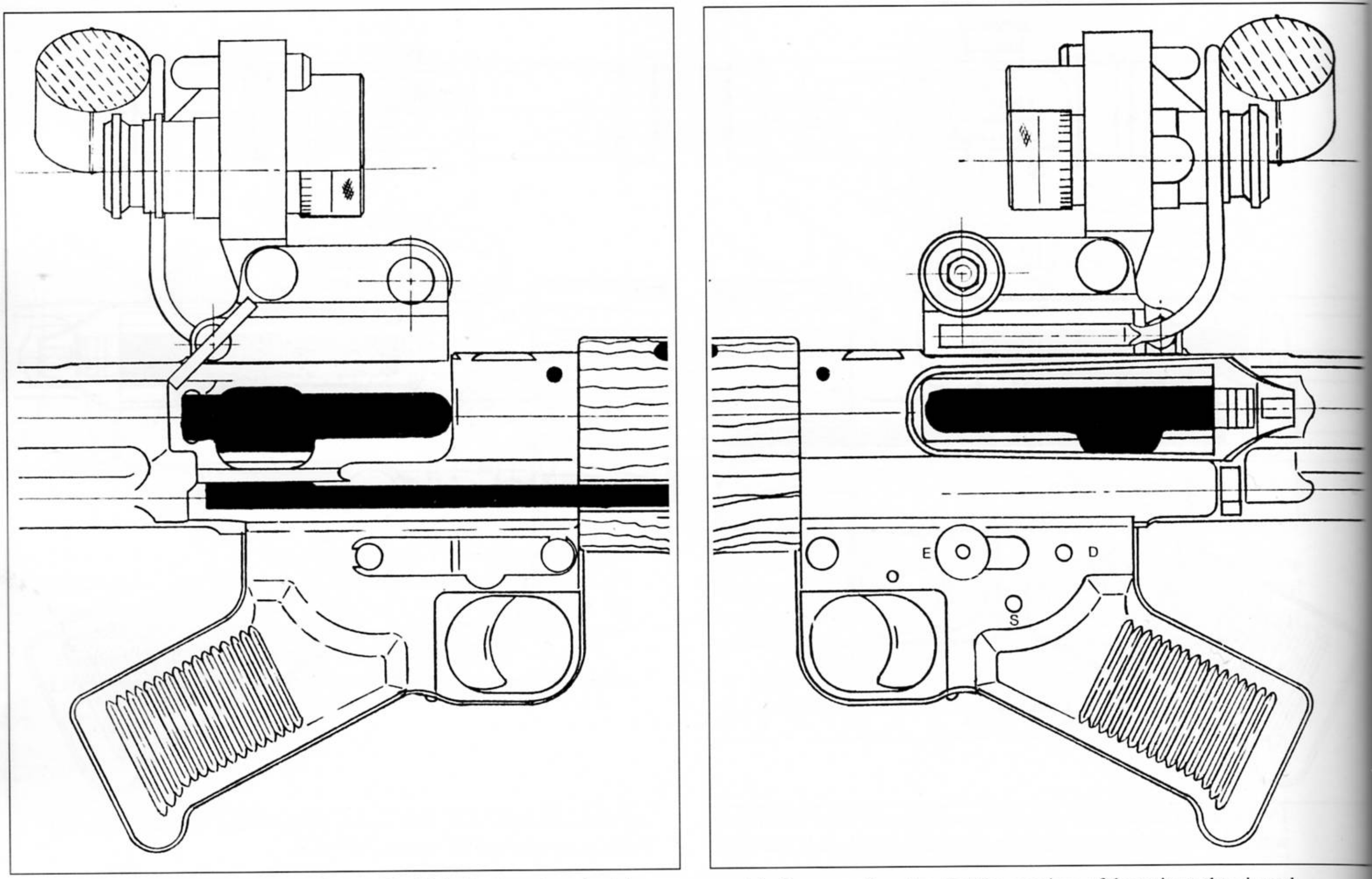
After firing from 50 to 100 rounds the ZFG42 telescopic sights evidenced a distinct hazing of the lenses, indicating that the durability of the cementing was inadequate. A series model with a drawn steel tube and a stamped metal foot was under development, but was not available in time for use in these tests.

The range and windage drums provided on the ZFG42 prototypes were very similar to previous design and construction, but during the trials it was discovered that bumps or shocks, or even the act of adjusting the sight, caused them to shear off. It was recommended that a broad slot that could be turned with a coin or screwdriver be provided on the drum face, so that the drum could be turned without relying on the knurled rim alone. Other suggested improvements included the following:

- the drum shaft should be made as thick as possible (5 – 6mm)
- the bearing for the knob should enclose the knob as much as possible to provide protection
- the range adjustment must be visible to the firer from the prone position
- the drums must be free to operate in temperatures from -40 to + 50 degrees centigrade.

c. Voigtländer (code 'ddx') Prismatic Sight

This rather cumbersome device provided a seven-degree field of view but featured front-mounted adjustment drums which were difficult or impossible to read, especially from the



16. Right and left closeup views of the Voigtländer prismatic sight as tested in the Tamewitz trials, shown mounted on an early production FG42. The inverted-'U'-shaped sponge-rubber head-rest is shown sectioned so that the eyepiece of the unit can be viewed. Not adopted. Drawings by Thomas B Dugelby

prone position. In addition the unit proved to be very sensitive to mechanical stress and dirt. Nonetheless a comparison trial was held with four riflemen each firing 10 shots single fire at a range of 500 metres, on open ground in good visibility, using both the ZFG42 and the prismatic sights. The resulting groups were as follows (patterns in cm):

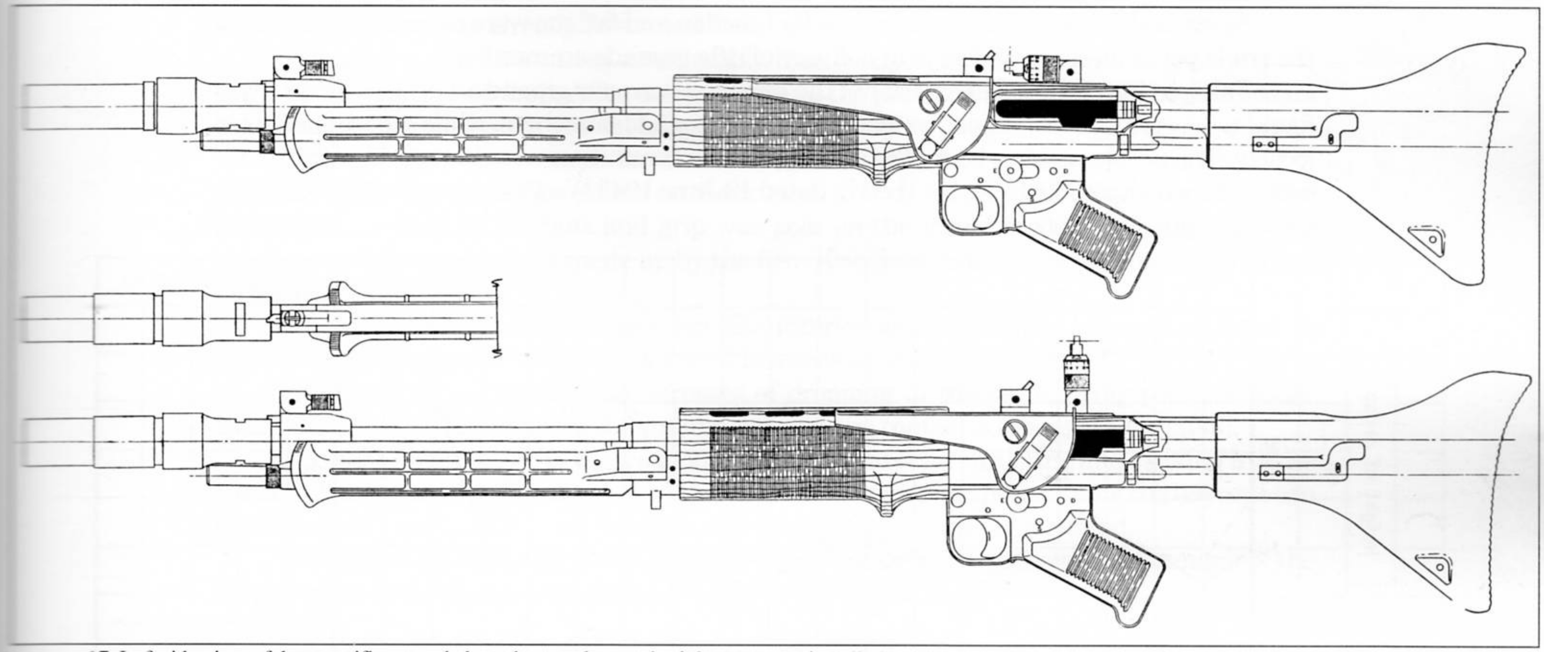
Rifleman no	1	2	3	4
ZFG42 sight	82x87	40x66	65x65	70x33
Prismatic sight	116x94	45x56	115x20	115x132

It was thus determined that the ZFG42 telescope was the better design, as with it the practical rate of single-shot fire could be doubled or even tripled, depending on the expertise of the rifleman, with no degradation of hit potential.

FG42 Grenade Launchers

Two types of launchers for rifle grenades were available for testing: an early model 171mm long with a grenade sighting scale graduated up to 235 metres, and a later design, developed at Tarnewitz, 176mm long with a range scale graduated to 250 metres.

A distinct advantage of the 235m sight was that it could be mounted immediately behind



17. Left side view of the two rifle grenade launchers and grenade sights developed for the Tarnewitz trials.
Above: the early (235-metre) sight and the 171mm launcher. Not adopted for reasons discussed in the text. Inset: top view of the launcher, installed.
Below: the later (176mm) grenade launcher and the 250-metre grenade sight. Despite the initial mounting position which blocked the magazine well, this sight was found to be more robust and was eventually adopted. Inset: top view of the launcher, installed.

Drawings by Thomas B Dugelby

the handguard on the receiver, without interfering with the weapon's magazine. However, this sight was found to be generally less stable, and could be easily bent to the side. In addition the 171mm grenade launcher could not be screwed far enough onto the muzzle of the test weapon because of a rather small shoulder in the threaded portion.

The prototype of the 250-metre Tarnewitz grenade sight was top-mounted in the same manner as the ZFG42, but hung over the left side of the receiver, blocking the magazine well. It was nevertheless regarded as more suitable for the FG42 because of its greater stability. A redesign of the sight mount bracket was recommended, which would mount directly behind the handguard like the 235m sight, leaving the magazine well unobstructed. The 176mm grenade launcher screwed firmly onto the threaded muzzle end of the barrel, right up to the detent for the flash suppressor.

No problems developed in functional firing with the large armour-piercing rifle grenade, although it was noted that the empty rifle grenade cartridge cases were not ejected because the breech did not open sufficiently.

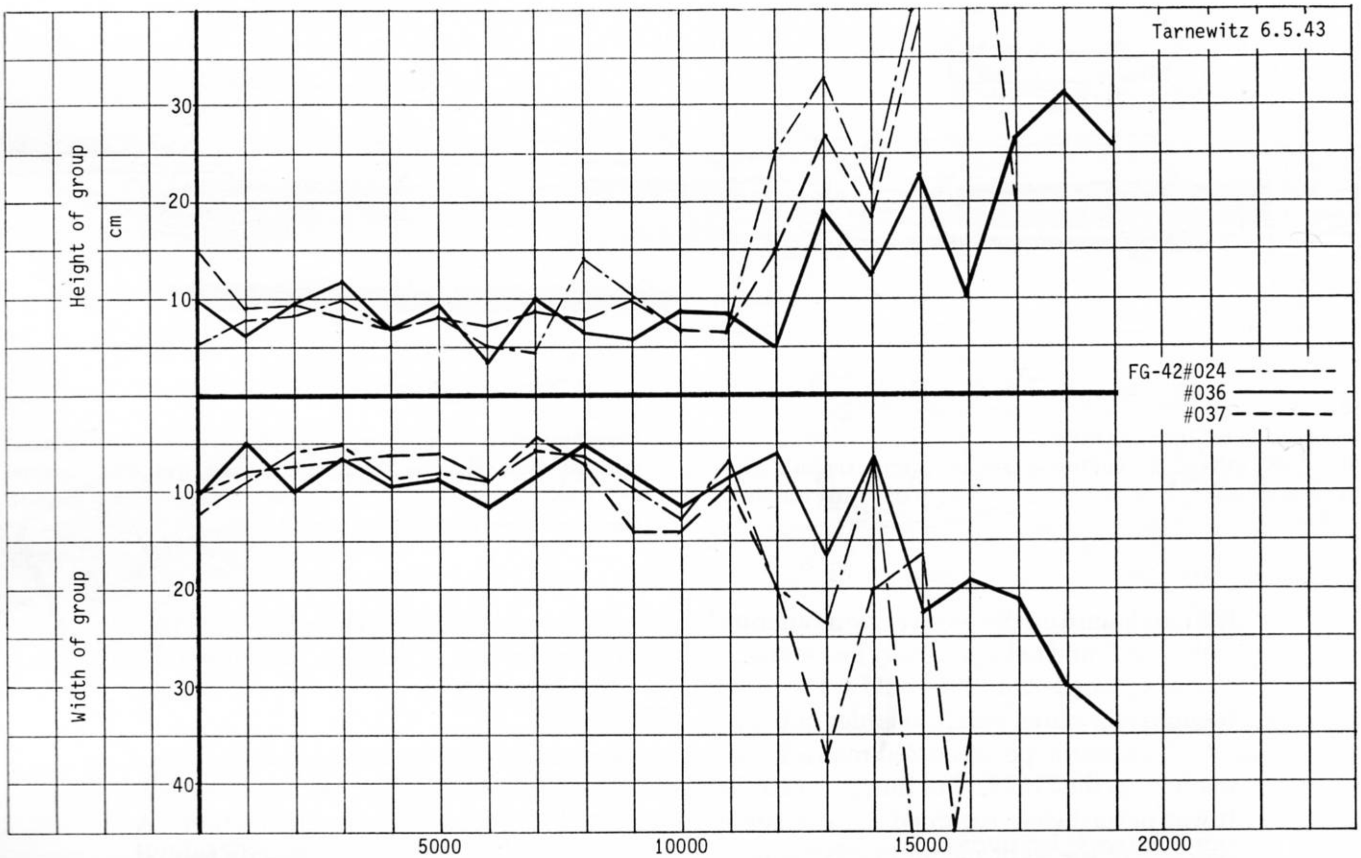
No differences in velocity and accuracy could be perceived when firing rifle grenades from the open and closed breech positions. High-speed photography confirmed that the breech did not open until after the grenade had left the launcher, so there was no need to provide some means of stopping the breech from opening. The normal magazine was found adequate for feeding rifle grenade cartridges.

The recoil in firing the rifle grenade was heavy enough so that in level firing with the weapon held against the shoulder the face of the firer was endangered by the magazine, and therefore it was necessary to remove the magazine in this type of firing. The heavy recoil also disturbed the adjustment of the grenade sight after each shot, indicating that the sight detent spring should be strengthened.

Over 70% burst cases occurred with the rifle grenade cartridges supplied, which interfered considerably with rapid reloading.

Sustained firing tests of both devices for function and fatigue were not completed during the trials period because of delays in delivery of rifle grenade ammunition.

Tolerancing of the rifled exterior of the large anti-armour grenades (*gr. Gew. Pzgr.*) was found to be poor. 10% could not be inserted in the grenade launchers, while others seated too loosely. The problems concerning the sight and the ammunition were reported in Communication (Schrb.) E6/1369/43 Secret II A1E, dated 12 June 1943 Wa Prw. 1, and to GLC/C-E6 for information.



18. A graph dated May 6, 1943, prepared from the results of the Tarnewitz trials, showing number of hits plotted against number of rounds fired by type 'D' FG42s serial nos 024, 036 and 037. Each square of the chart represents 1,000 rounds fired.

Redrawn from the original by Thomas B Dugelby

Results of the Type 'D' Endurance Trials

1. Handling

Because of its light weight and relatively small dimensions, the handling characteristics of the FG42 are easy and comfortable. The sight elevation of the weapon is regarded as normal for the prone firing position, but too low in the standing position. It is impossible to set the ideal sight elevation for every firing position, and therefore deviations must be accepted.

The form of the stock, with its curved, horn-like continuation above the support surface is not satisfactory in either the prone or standing firing position. A new model is under development. In high-angle fire with rifle grenades the stock proved to be too weak, and a reinforcement is under development at Rheinmetall-Borsig.

Trigger access and use of the trigger is unfavourable because of the form of the handgrip, which is very much slanted to the rear. A more substantial form of handgrip should be implemented, and has already been modified and reinforced in the series model.

The trigger pressure varies considerably from weapon to weapon, and is generally too high (up to 7.1kg [15.65 lbs]). After extensive firing the pressure point changes or disappears completely because of wear. A total trigger pressure of up to 3.5kg [7.7 lbs] is recommended.

Disassembling the weapon for cleaning can be performed quickly without the aid of auxiliary tools. The insulation [found on the original prototypes only; not adopted on the serial production models] on the butt and grip was poor on the initial models and chips off. The insulation of the sample butt made up by the firm Krieghoff/Suhl (asbestos fibre coating) can be regarded as adequate.

When the barrel becomes very hot the interior surfaces of the handguard begin to carbonise, and consequently the handguard becomes loose in its seating.

The bipod cannot sustain the stresses of dropping to the prone firing position under combat conditions. It sinks into soft ground because the contact surfaces are too small.

The light construction of the weapon makes it suitable for thrusting and striking in close combat. The bayonet is regarded as adequate for its intended purpose. Fixing the bayonet can be performed rapidly, but is not possible with the grenade launcher mounted.

The weapon is generally not sensitive to hard shocks and dropping. Disalignment of the diopter sight and deformation of the barrel were not noted.

2. Operation

The operation of the FG42 is satisfactory. Most of the malfunctions were caused by the magazine.

After implementation of the recommended modifications and improvements to the bolt stop, firing pin spring assembly, handgrip, safety/fire selector and by reinforcing the handgrip and adding a dust cover, trouble-free firing of up to 12,000 rounds can be anticipated.

The use of steel or brass cartridge cases had no effect upon the weapon. The burst cartridge cases which occurred during the trials with steel cartridge cases could be removed without special tools by pulling the cocking handle back vigorously. Burst cartridge case bases did not occur.

Jammed cartridges occurred occasionally after 12,000 rounds with increased firing rates. Operation in extreme cold and heat occasioned no malfunctions.

The FG42 is not sensitive to sand and dirt when the bolt is closed and the magazine is inserted. The sand adhering to the breech is brushed off after several shots or is blown off by powder gases. After dusting the breech with sand with the mechanism in the open position (for full automatic fire) or with the magazine removed, a fresh cartridge could be only partly seated and the bolt would not close. Immediate action would seat the next cartridge, but it would not fire. In attempting a repetition of immediate action the return of the bolt was inhibited by the jammed cartridge or because the bolt head was fouled. The bolt assembly had to be thoroughly cleaned in such cases before trouble-free operation was restored.

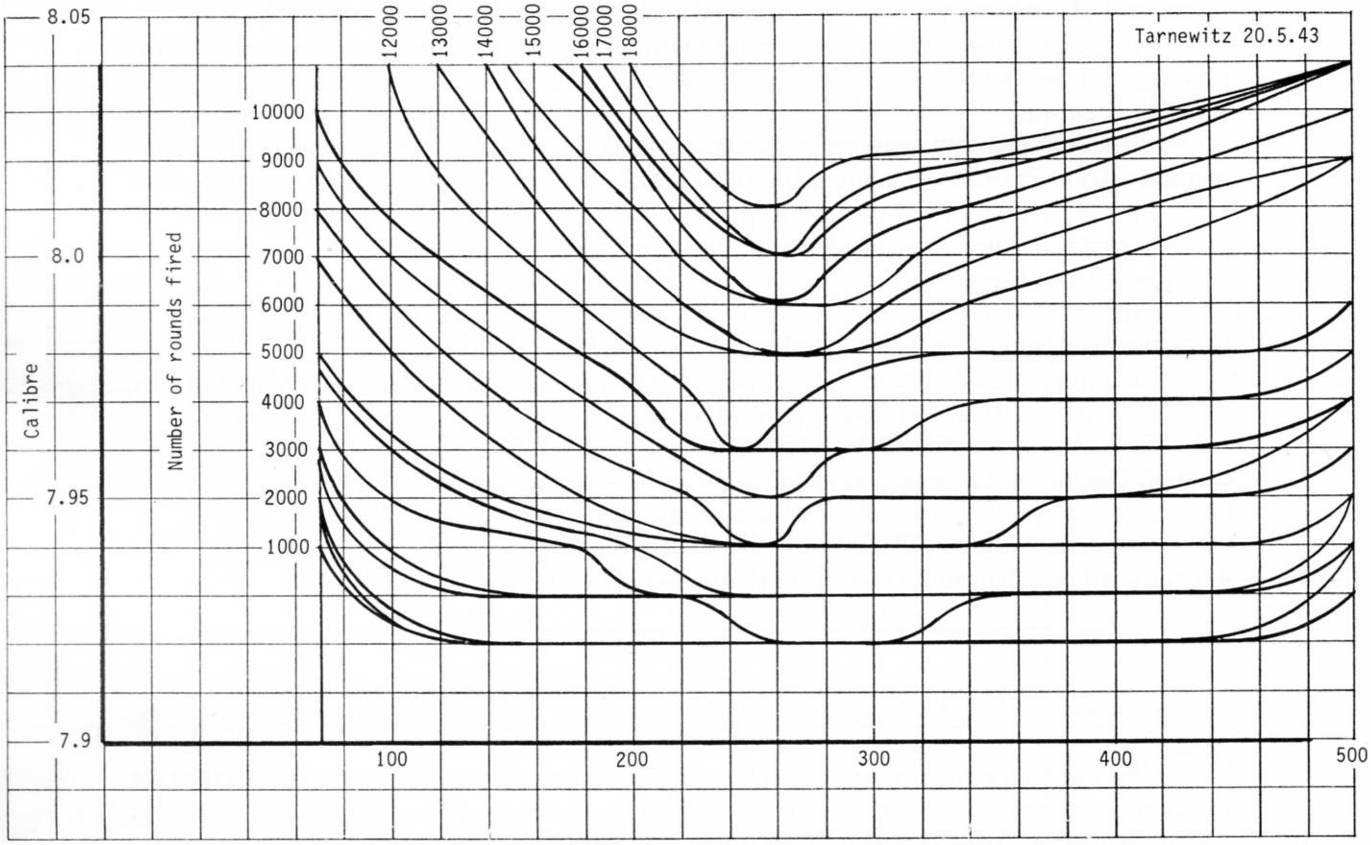
In order to prevent operational malfunctions due to sanding when the magazine is removed, it is recommended that the magazine well be provided with a cover.

The magnitude of the muzzle flash in darkness, either in single or sustained fire, is not distracting when either the muzzle brake or grenade launcher is mounted.

3. Service Life/Fatigue

a. General

After each series of 1,000 rounds fired, the firing rate and hit patterns for FG42s nos 024, 036 and 037 were determined up to a total firing stress of 20,000 rounds. The decrease in muzzle velocity up to approximately 12,000 rounds was an average of 25 m/s (3.4%). The rate of fire, which remained almost constant up to 5,000 rounds, rose rather steeply with increasing stress.



19. A graph dated May 20, 1943, prepared from the results of the Tarnewitz trials, showing the degree of barrel wear as a function of number of rounds fired by type 'D' FG42 serial no 024.
Redrawn from the original by Thomas B Dugelby

After firing 6 – 7,000 rounds the initial rate of fire of approximately 900 rounds per minute increased by 100 – 200 rounds per minute. The greater frequency of malfunction is very likely related to this increase in firing rate as the number of rounds fired increases.

b. Barrel

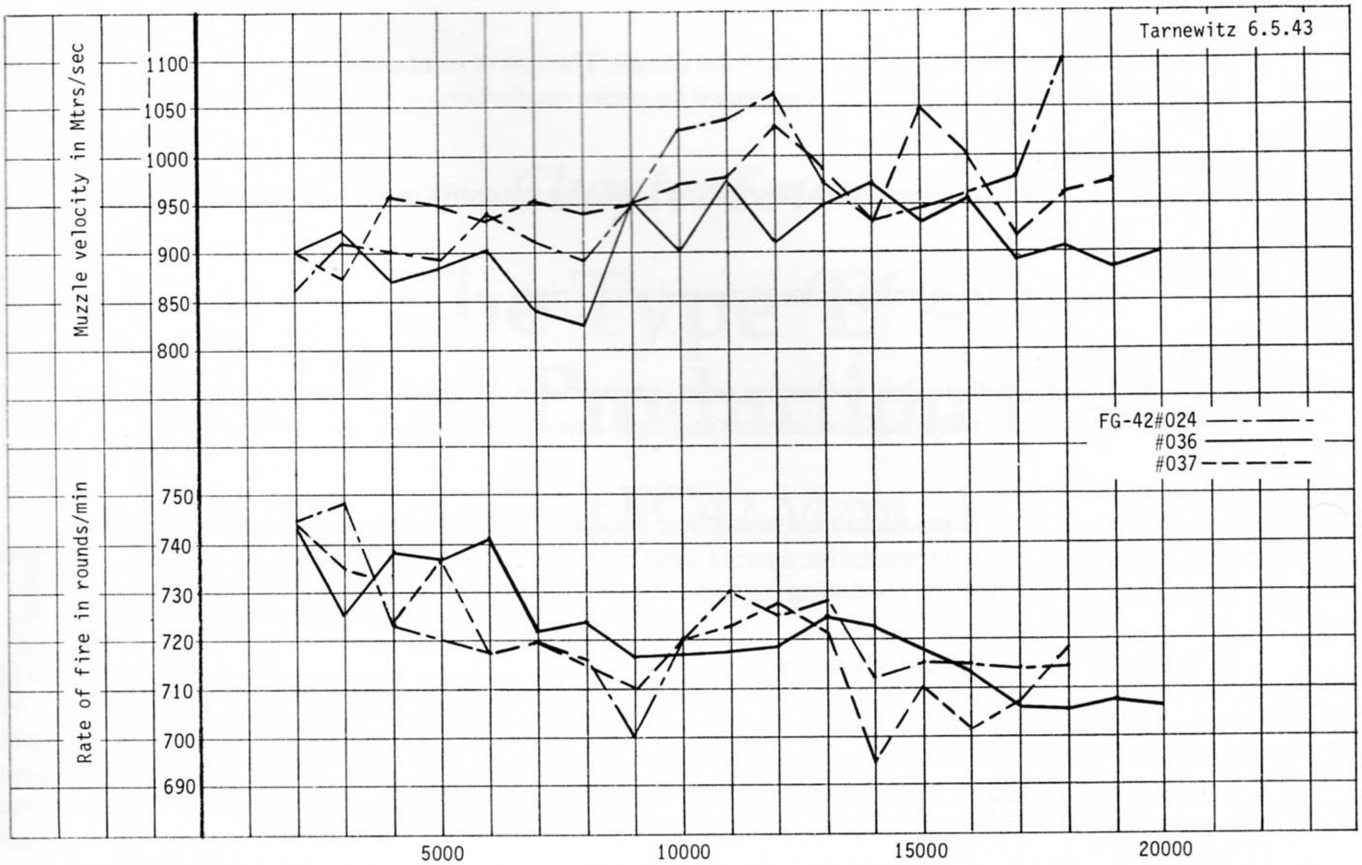
The specification states that the barrel is regarded as being shot out when bullets begin to keyhole. According to this criterion, the useable life of the barrel is 18,000 rounds. However, use of the barrel over 12,000 rounds is not recommended because the quality of hit patterns deteriorates unacceptably after this point.

c. Receiver

The (milled) receiver is adequate to sustain 20,000 rounds, but after 3 – 4,000 rounds the support for the magazine in the interior of the receiver is severely damaged so that the solid seating of the magazine can no longer be assured. It is recommended that the magazine stop no longer be positioned inside the receiver of the series weapons.

The magazine catch spring is too weak, so that particularly the 20-round magazines tend to fall out during firing. In addition, because of the loose seating, the action of the bolt stop is irregular.

The engaging surface of the bolt stop becomes severely worn after 5,000 rounds, after which the action of the bolt stop becomes irregular and the detent surfaces on the gas piston suffer premature damage. The bolt stop pin tends to fall out. In the stamped production model of the weapon the bolt stop has been eliminated.



20. A graph dated May 6, 1943, prepared from the results of the Tarnewitz trials, showing a comparison of muzzle velocity plotted against rate of fire and number of rounds fired by type 'D' FG42s serial nos 024, 036 and 037. Each square of the chart represents 1,000 rounds fired. Redrawn from the original by Thomas B Dugelby

In the case of one trials weapon, after about 10,000 rounds the cocking handle recess in the gas piston was torn out, although no malfunction resulted from this.

d. Handgrip

The handgrip housing with its enclosed trigger mechanism is generally very sensitive and experiences major defects and malfunctions after approximately 5,000 rounds, particularly in the single shot mode. By then the pin holes are deformed and expanded, thus loosening the seating of the handgrip unit on the receiver. This changes the position of the trigger relative to the gas piston, resulting in erratic operation or failure of the interruptor. Firing of individual shots is no longer possible.

After extensive firing the trigger guard separates from its mounting. Frequent breakages of the safety/fire selector and handgrip retaining pin occur, caused by the deformation of the handgrip mounting holes and the consequent loosening of the handgrip on the receiver.

The durability of the pin retaining plate on the handgrip has to be improved, and the interruptor spring should be recessed into the interruptor, to prevent the spring from spreading. It is recommended that the handgrip be generally reinforced.

e. Bolt mechanism

The tabs on the yoke of the gas piston break after an average of 9,000 rounds. Shortening the tabs, as was done by Rheinmetall-Borsig, provided no appreciable correction.

The guide rails of the ejector should be reinforced as much as possible.

The durability of the firing pin spring is completely inadequate. It breaks after an average of 2 – 3,000 rounds and takes a set very quickly, after which the spring bearing separates and a malfunction or breakage of the guide tube occurs. The use of compound-wound firing pin springs is urgently necessary and is projected for series production.

f. Buffer assembly

No problems were experienced with this assembly during the entire course of the trials.

g. Buttstock

The buttstock lock spring broke in one weapon during firing.

h. Muzzle brake

No difficulties, or defects due to heating, were encountered. The noise of detonation of the weapon impacts painfully on the eardrums in longer firing sequences.

i. Handguard

In addition to the carbonisation and consequent loosening mentioned above, the handguard does not provide sufficient insulation against a hot barrel, particularly in conditions of tropical heat. The application of an insulating coating between the wood and the barrel is necessary.

j. Magazine

The magazines in their present design have, as noted, caused the majority of problems. They are poorly toleranced and the follower spring and floorplate are generally too weak. The action of the follower against the bolt stop after the last shot has been fired is uncertain, and after extended use the reinforcing ribs tend to separate. Provision of inspection holes is regarded as necessary, and the magazine should be lengthened to facilitate handling with gloves.

Summary of the Type 'D' Endurance Trials

The paratrooper rifle FG42 is a self-loading weapon which can be used in exceptional instances as a machine gun by selective adjustment of single and sustained fire. The trials of the [type 'D'] test model series manufactured by Rheinmetall-Borsig, Sömmerda have been concluded. The FG42 weapons used in the trials are equipped with front or middle bipod support, magazines of 10- and 20-round capacity, a removable telescopic sight and a grenade launcher for rifle grenades.

From the experience of the extensive firing trials, notes on modifications designed to strengthen several components of the weapon and improve its operational reliability even under the most adverse firing conditions have been regularly communicated to GL/C-E6, and were summarily stipulated in a final meeting. After the modifications have been implemented, it can be anticipated that the FG42 will provide trouble-free operation under all conditions (dirt, cold, heat) up to a stress factor of 10- to 12,000 rounds. The accuracy of the weapon is equivalent to that of the carbine K98k, as is the ease of handling in all types of positions. When firing with bipod, the middle support position provides the greater advantage, because better ease of handling, as compared to the only slightly better accuracy with the forward bipod position, is more important, according to the opinion of the test facility.

The telescopic sight in improved design can be used even with rough handling, and essentially simplifies only target acquisition, as a better hit pattern as compared with the diopter sight was not evidenced.

Using the grenade launcher is an uncomplicated procedure which requires no special equipment. Sustained firing tests with rifle grenades have not yet been completed. The Operating Instructions are ready for printing.

Chapter Four

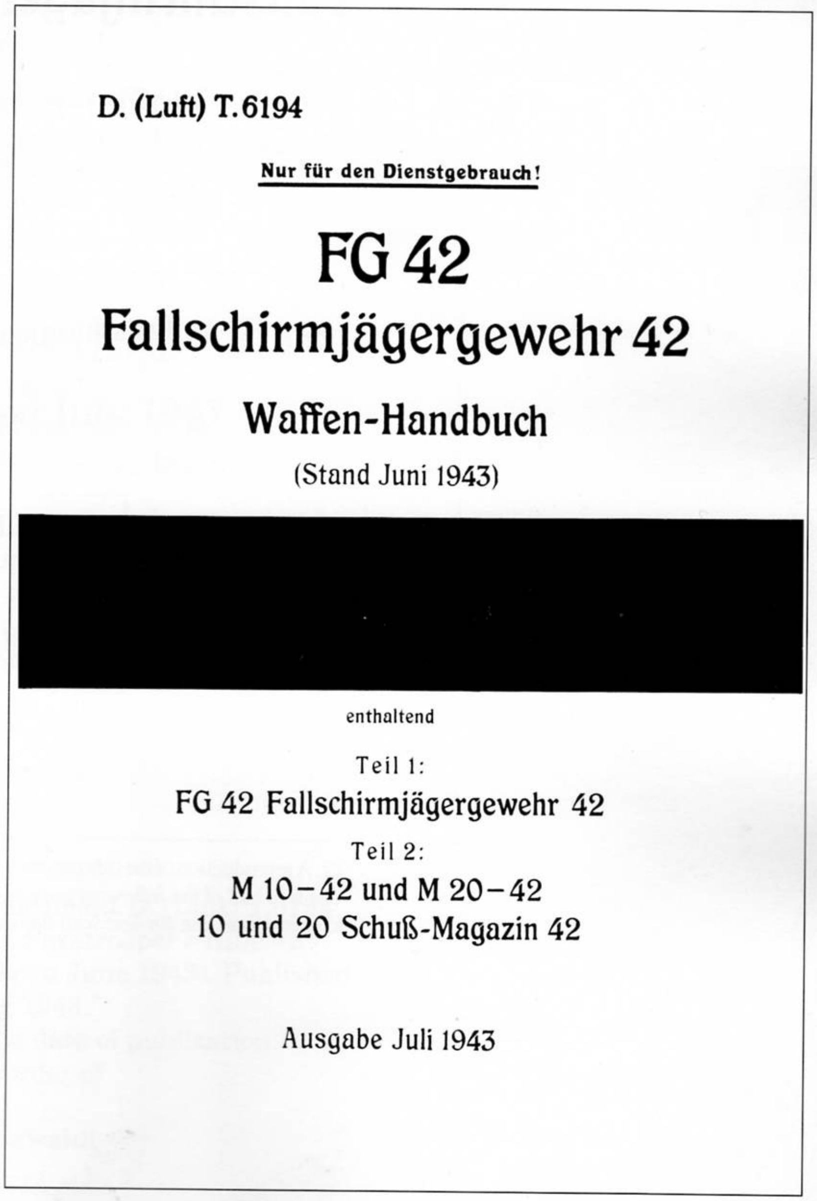
The Type 'E' – The First Production FG42

The First FG42 Manual

The Operating Instructions mentioned above were duly published and issued as the July, 1943 edition of "D. (Luft) T.6194". This first manual for the FG42 was based on the status of development as it existed in June of 1943, when the decision had been taken to accept the modifications and improvements recommended in the secret Tarnewitz trials report, and proceed with the series manufacture of the resulting (type 'E') weapon.

As noted, official distinction among the various models of the FG42 was never made, and, although this first manual was intended to support the issue of the FG42 type 'E', in July of 1943 there were as yet no type 'E' weapons in existence, and so to save time and expense photographs of type 'D' FG42s were used throughout.

The following is a translation of the first edition of D. (Luft) T.6194, using the original German part identifier codes:



D. (Luft) T.6194

Nur für den Dienstgebrauch!

FG 42

Fallschirmjägergewehr 42

Waffen-Handbuch

(Stand Juni 1943)

[redacted]

enthaltend

Teil 1:

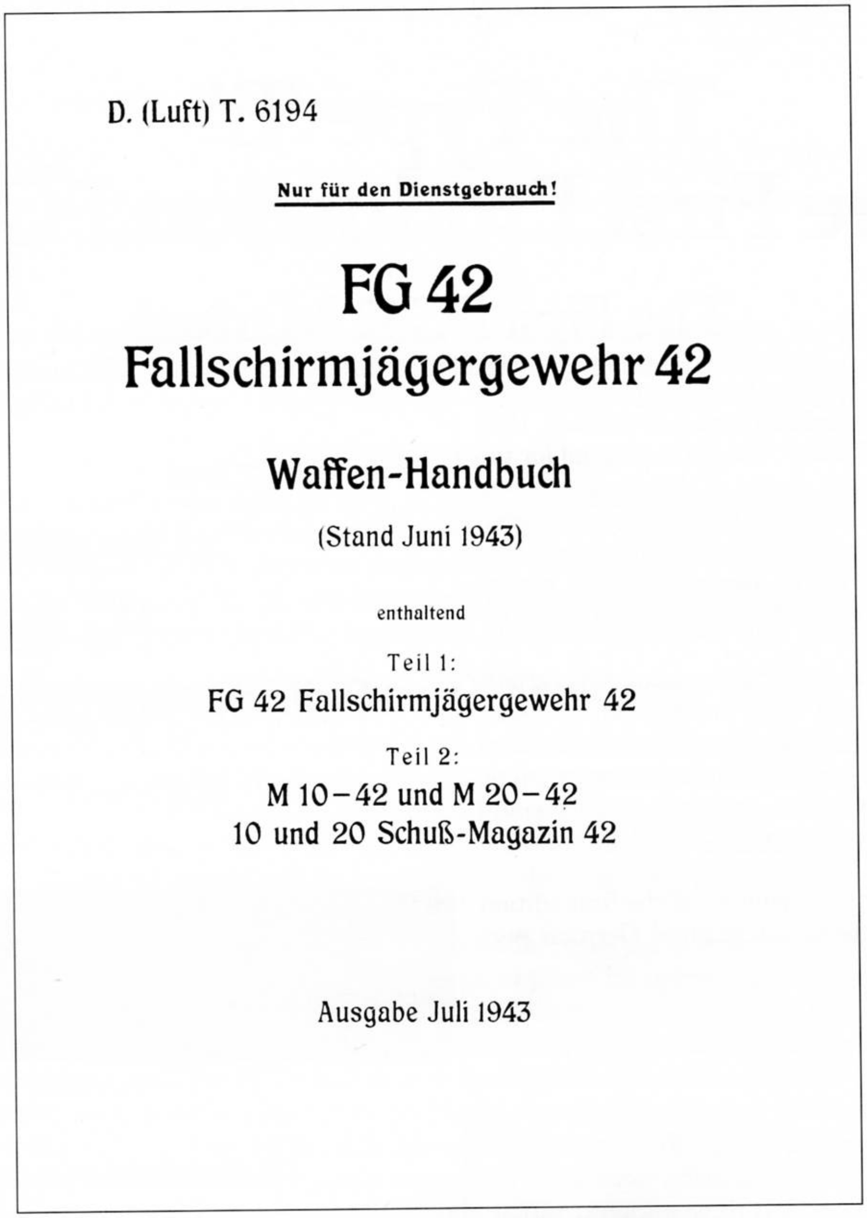
FG 42 Fallschirmjägergewehr 42

Teil 2:

M 10–42 und M 20–42
10 und 20 Schuß-Magazin 42

Ausgabe Juli 1943

21. A reproduction of the cover of the first edition of the FG42 manual D. (Luft) T.6194, published on July 21, 1943. Issued in support of the type 'E' FG42, but illustrated with pictures of type 'C' and 'D' weapons. The original manual cover was "*Luftwaffe* blue" cardboard, with thin, salmon-coloured cardboard dividers for Parts 1 and 2 (*Teil 1 und 2*).
Courtesy James Alley



D. (Luft) T. 6194

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FG 42
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Teil 1:
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Ausgabe Juli 1943

22. A reproduction of the title page of the first edition of D. (Luft) T.6194. The first half of the following page of translated text has been arranged to correspond line-for-line with this title page.

D. (Luft) T.6194

Only for Service Use!

FG42
Paratrooper's Rifle 42
Weapon Handbook
(Issued June 1943)

consisting of

Part 1:

FG42 Paratrooper's Rifle 42

Part 2:

M10 – 42 and M20 – 42

10 and 20 round Magazines 42

Published July 1943

> This is a secret document according to Military law No 88 (introduced on April 24, 1934). Anyone misusing this document will be punished by this law and could be punished by other ordinances.

The Minister for Air Travel
and Commander in Chief of the Air Force

Berlin, the 21st July 1943

Technical Service
GL/C (-E61F)

I hereby certify this document D. (Luft) T.6194
— N.f.D. — "FG 42. Paratrooper's Rifle 42
Weapon Handbook (Issued June 1943). Published
July 1943.".
It is valid from the date of publication.
By order of

Pasewaldt

Part 1

FG42

Paratrooper's Rifle 42

Notice! To comprehend 'forward', 'rear', 'right', 'left', 'above' and 'under', picture the weapon in the line of sight!

I. Purpose and Characteristics

The paratrooper rifle 42, FG42, is a full automatic gas-operated weapon firing from a fully locked breech.

The weapon fires single fire and, in emergency, in the automatic mode. Single fire is effected from the closed breech position; automatic from the open breech.

Cartridges are fed from the left side by magazines holding 10 and 20 rounds. All ammunition fired by the carbine K98k can be used.

The cartridges are fired by means of a spring-loaded firing pin.

The sight mechanism consists of a rear aperture and a front post sight.

For firing from the prone position, the weapon is equipped with a folding bipod.

For hand-to-hand combat the weapon is equipped with a bayonet.

For sniper and sharpshooter use a telescopic sight (ZFG42) can be mounted; firing rifle grenades is accomplished by screwing the grenade launcher FG42 onto the barrel in place of the muzzle brake and mounting the grenade launcher sight FG42.

II. Technical Data

Muzzle velocity (Vo)	740 m/s [2,428 f/s]
Theoretical rate of fire (automatic) with M20-42	approx 900 rpm
Practical rate of fire (automatic) with M20-42	approx 250 rpm

Weight:

FG42 without telescope, grenade launcher or magazine	4.2 kg [9.26 lbs]
magazine M20-42, loaded	0.818 kg [1.8 lbs]

Dimensions:

Calibre	7.92 + 0.04mm
Number of rifling grooves	4
Diameter between opposite grooves	8.2 + 0.05mm
Barrel length	500mm [19.69"]
Overall length	945mm [37.2"]
Rifling: right hand; one turn in	240mm [9.4"]
Length of mainspring	540 +/- 10mm
Firing pin protrusion	1.3 - 1.5mm
Length of firing pin spring, extended	90mm

III. Description

The FG42 consists of two moving and three fixed main assemblies. These are as follows:

Receiver assembly with barrel (A), fixed
Handgrip assembly (B), fixed
Buffer assembly (C), fixed
Bolt assembly (D), moving
Butt assembly (E), moving

In addition to these main components there are the following two other assemblies:

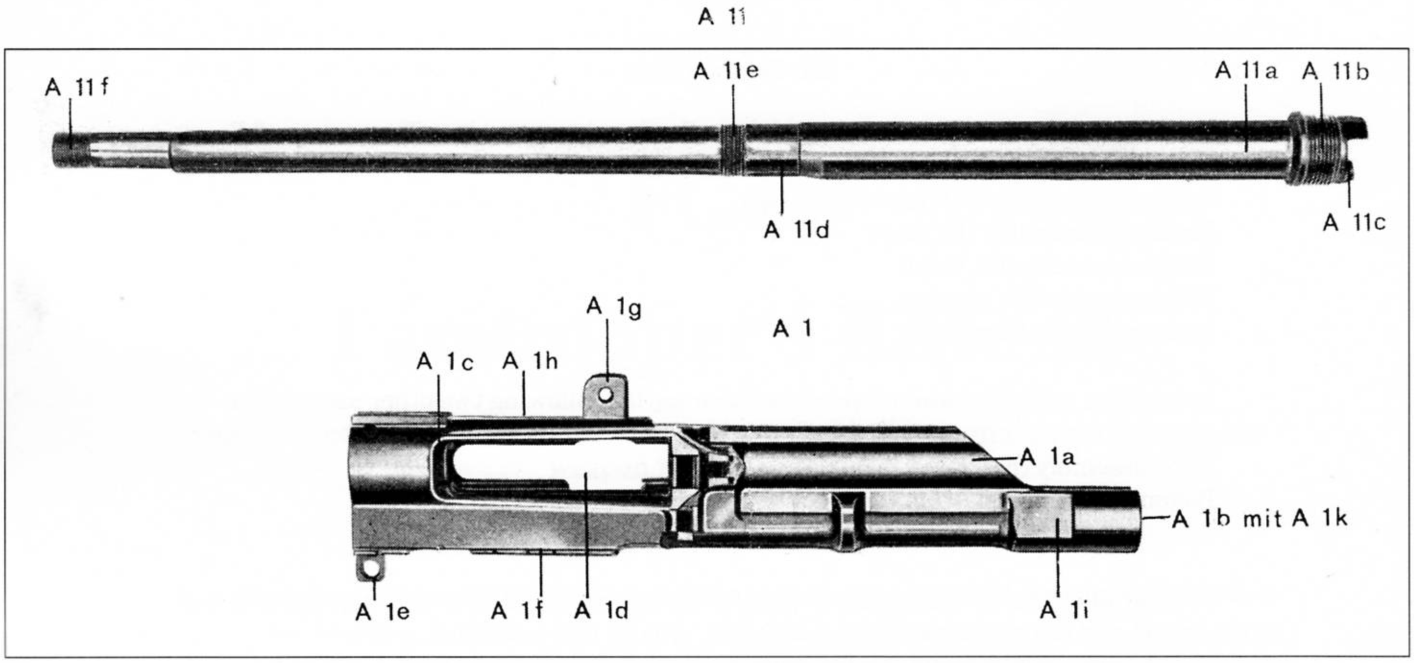
Sling assembly (F)
Bayonet assembly (G)

A. Receiver assembly with barrel

The barrel is fixed to the receiver, wherein the bolt is carried. The cartridge is detonated in the barrel and the projectile is given direction, velocity and rotational motion.

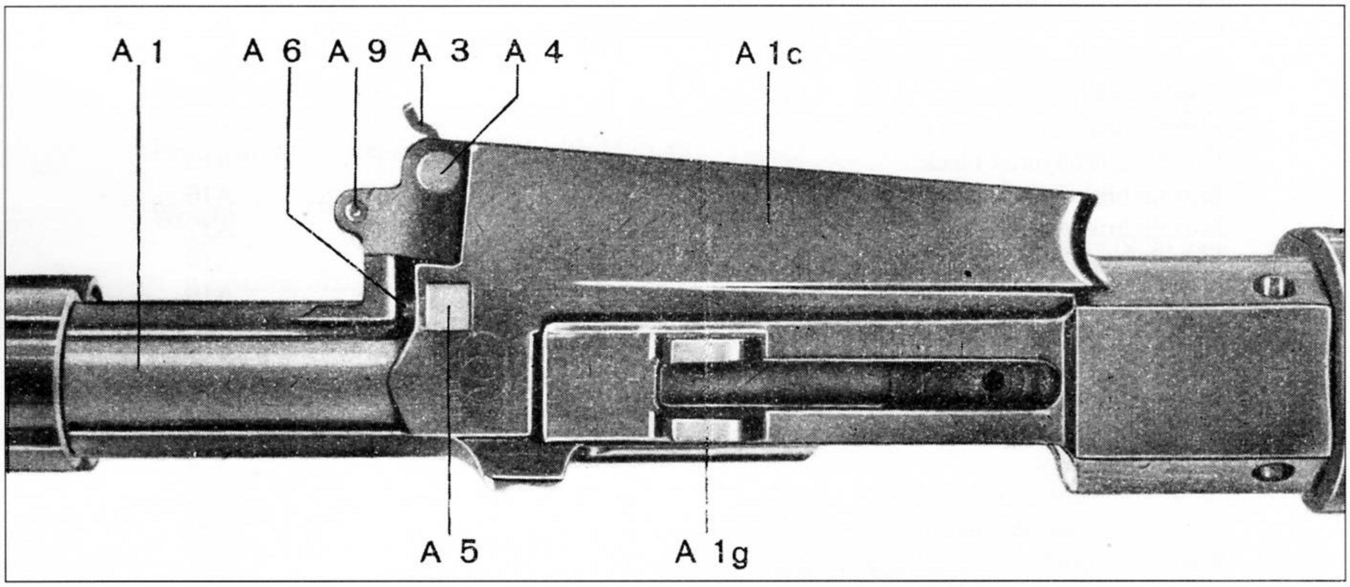
The receiver and barrel assembly consists of:

Receiver	A1
Barrel retaining pin	A2
Magazine catch	A3
Magazine catch retaining pin	A4
Bolt stop	A5
Bolt stop pin	A6
Bolt stop spring	A7
Ejector stop	A8
Ejector stop pivot pin	A9
Ejector stop spring	A10
Barrel	A11
Gas block/bipod mount lock nut	A12
Gas block/bipod mount	A13
Muzzle brake mounting sleeve	A14
Front sight/bayonet block	A15
Muzzle brake catch	A16
Muzzle brake catch spring	A17
Muzzle brake catch pin	A18
Gas cylinder plug	A19
Bipod leg, right	A20
Bipod leg, left	A21
Bipod leg retaining pin	A22
Bipod leg detent spring	A23
Rear sight body	A24
Rear sight elevation ring	A25
Rear sight locking ring	A26
Rear sight post	A27
Rear sight spring guide	A28
Rear sight spring	A29
Rear sight detent spring	A30
Rear sight pivot pin	A31



23. Fig 6 from the first edition of D. (Luft) T.6194: FG42 type 'D' receiver and barrel, stripped and disassembled.

Front sight base	A32
Front sight blade	A33
Front sight detent plunger	A34
Front sight detent spring	A35
Front sight pivot pin	A36
Muzzle brake	A37
Handguard	A38
Gas cylinder	A39



24. Fig 7 from the first edition of D. (Luft) T.6194: FG42 type 'D' receiver assembly, top view.

The barrel (A11) is rigidly screwed into the receiver (A1) and retained by the barrel retaining pin (A2). The receiver has two longitudinal bores (A1a and A1b) which serve to guide the bolt assembly (D). The magazine well (A1c) is on the left hand side of the receiver, and the ejection port (A1d) is on the right. On the lower surface of the receiver are the forward lug (A1e) and a T-slot (A1f) with relief cuts for locating the handgrip assembly (B).

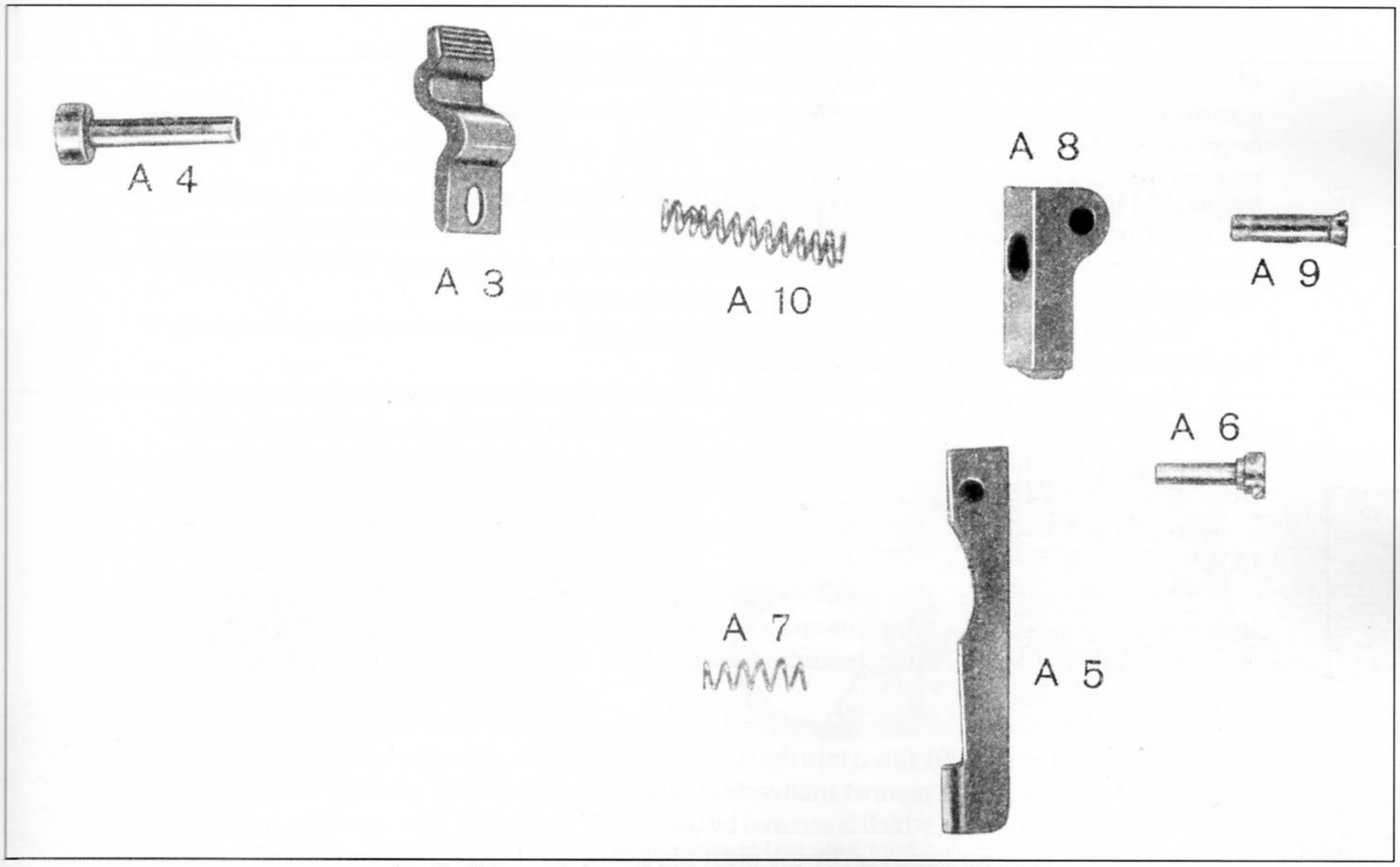
To retain the magazine, the magazine catch (A3) and its pin (A4) are mounted at the rear of the magazine well (A1c).

At the top rear of the magazine well (A1c) is a vertical square hole for the bolt stop (A5), moved by its stop pin (A6) and spring (A7).

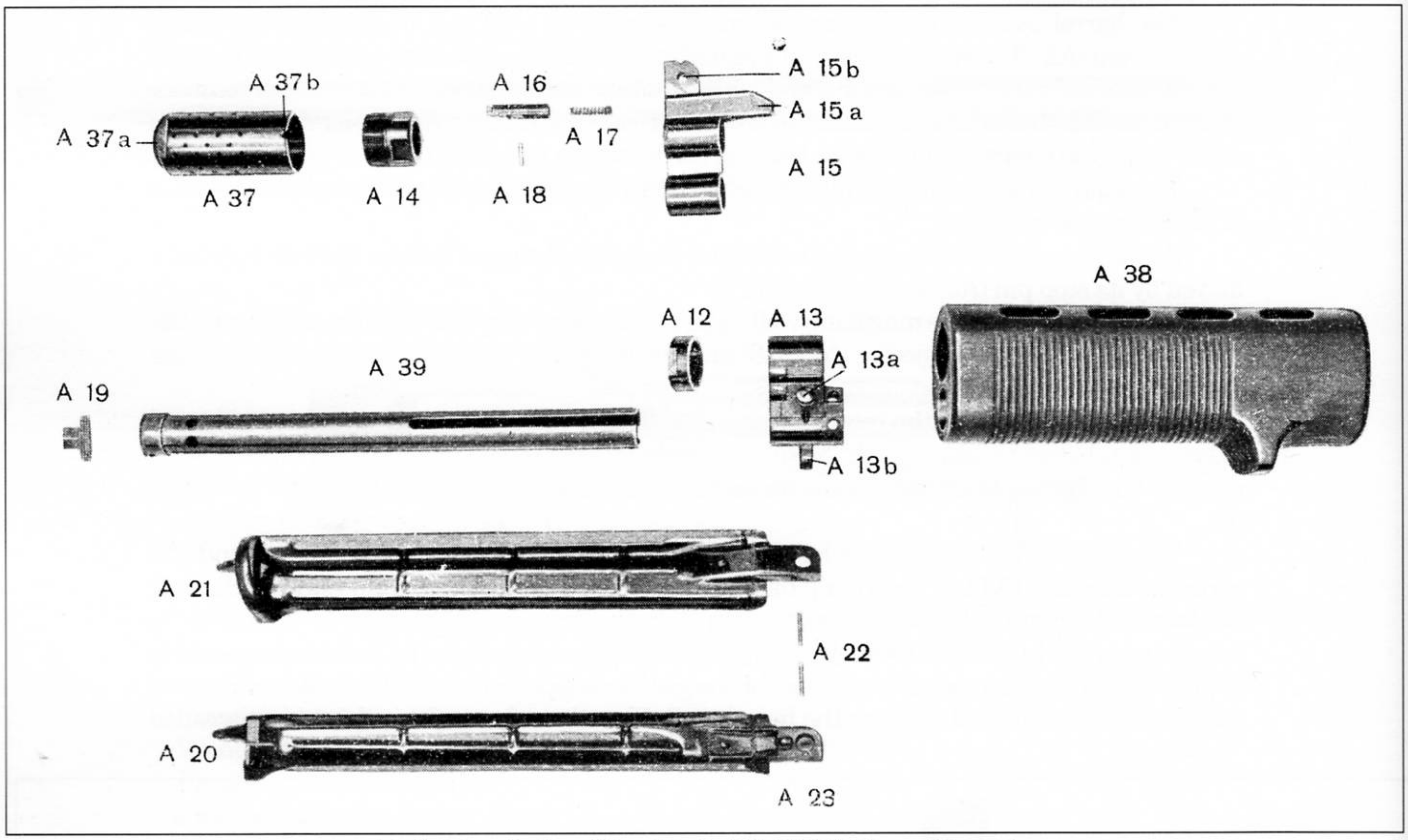
In the rear part of the magazine well (A1c) is the ejector stop (A8), held in position by the ejector stop pin (A9). The ejector stop (A8) and the magazine catch (A3) are operated by the same spring (A10).

On its upper surface the receiver has a lug (A1g) to receive the rear sight assembly and a dovetailed bar (A1h) onto which the telescopic sight is mounted. The lower bore (A1b) of the receiver has three sets of interrupted threads (A1k) at the rear to retain the buffer assembly (C).

The barrel (A11) is 500mm long. Internally it consists of the rifled portion and the cartridge chamber (A11a). The rifling has four grooves with a constant right hand pitch, with one turn in 240mm. On the rear end of the barrel are the threads (A11b) for screwing the barrel into the receiver. In addition two bolt locking cams (A11c) are machined in. In the centre section of the barrel a locating step is machined for the gas block/bipod mount (A13), and a transverse gas port (A11d) is drilled through the barrel wall. Directly in front of this there is a threaded



25. Fig 8 from the first edition of D. (Luft) T.6194: FG42 type 'D' magazine catch and bolt stop components, disassembled.



26. Fig 9 from the first edition of D. (Luft) T.6194: FG42 type 'D' muzzle brake, front sight, gas cylinder, gas block, bipod and handguard components, disassembled.

section (A11e) for the gas block lock nut (A12). At the front end of the barrel is a stepped area for mounting the front sight/bayonet block (A15), and a threaded portion (A11f) for attaching the muzzle brake mounting sleeve (A14) which locks the front sight/bayonet block in place and also retains the muzzle brake (A37) or the grenade launcher 42.

The cylindrical muzzle brake mounting sleeve (A14) is threaded internally and externally to half its length, and has external mounting flats.

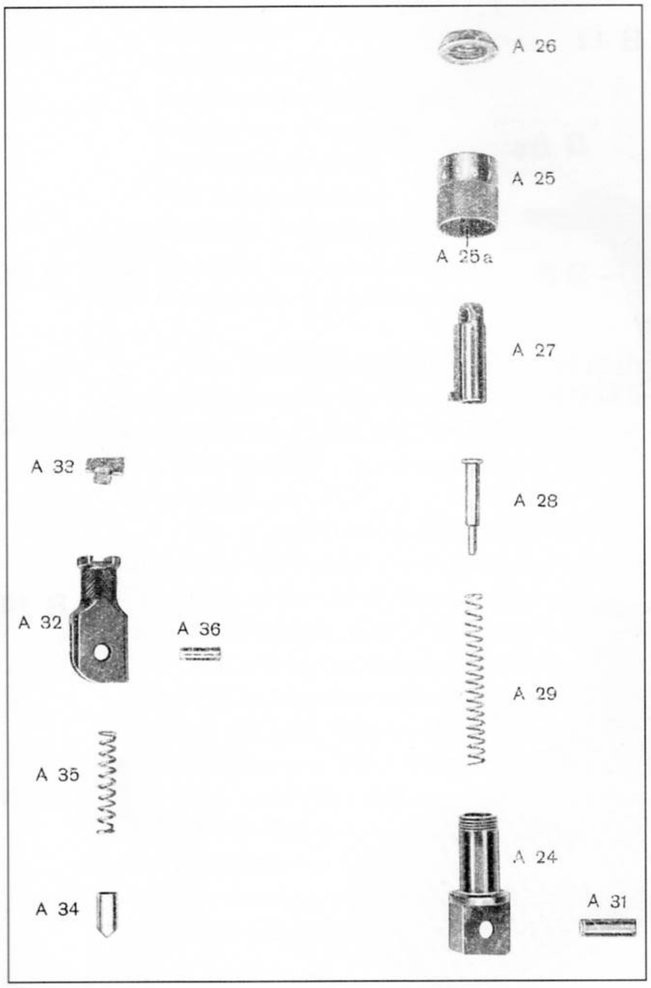
The upper ring of the front sight/bayonet block (A15) is slid onto the barrel, the bayonet (G) being located in the lower ring. The upper square bar (A15a) of the block is aligned with a corresponding flat machined onto the top surface of the barrel and holds the lug (A15b) for the front sight base (A32).

In addition the square bar (A15a) holds the muzzle brake catch (A16) with its spring (A17) and pin (A18).

The muzzle brake (A37) is a hollow cylindrical body with numerous gas escape holes in its circumference, and mounting flats on its front end (A37a). Its rear end is threaded internally to screw it onto the muzzle brake mounting sleeve (A14), and has a notch (A37b) to accept the muzzle brake catch.

The diopter rear sight assembly consists of the rear sight post (A27) together with its guide (A28) and spring (A29), fitted into the rear sight body (A24), and adjusted by the elevation ring (A25). The post is held against inadvertent adjustment by its foot catching in the detent (A25a) of the elevating ring, which is secured by the locking ring (A26). The rear sight assembly is fastened to the receiver lug (A1g) by the pivot pin (A31), and is held in the raised or lowered position by the detent spring (A30), which is rivetted to the receiver (A1) and is not removable.

In the front sight assembly, the front sight blade (A33) is inserted into the dovetail on top



27. Fig 10 from the first edition of D. (Luft) T.6194: FG42 type 'D' front and rear sights, disassembled.

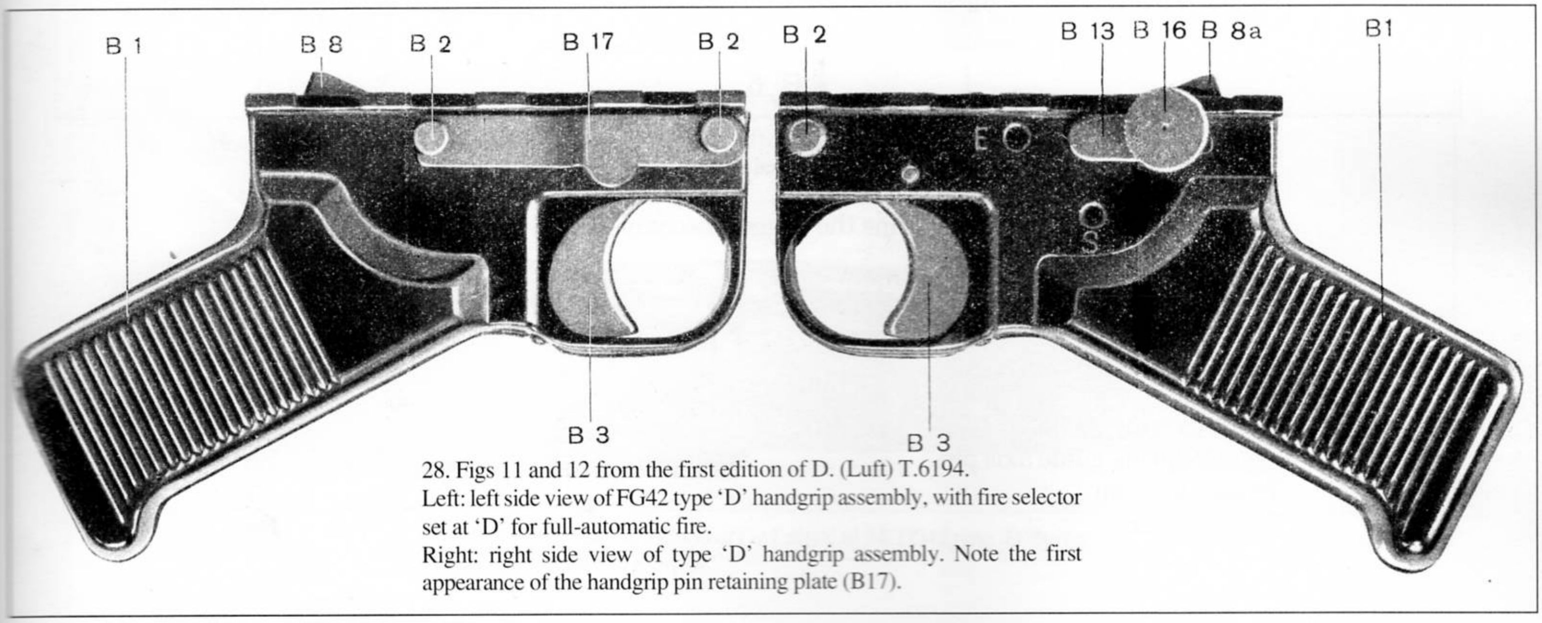
of the front sight base (A32). The detent plunger (A34) and its spring (A35) are inserted into the hollow of the front sight base, and the assembly is retained on the lug (A15b) of the front sight/bayonet block (A15) by the front sight pivot pin (A36).

The handguard (A38) protects the supporting left hand of the firer from burns from the heated barrel. The upper hole of the handguard is fitted over the barrel, and the handguard is located in position by the gas block/bipod mount (A13) and secured with the lock nut (A12).

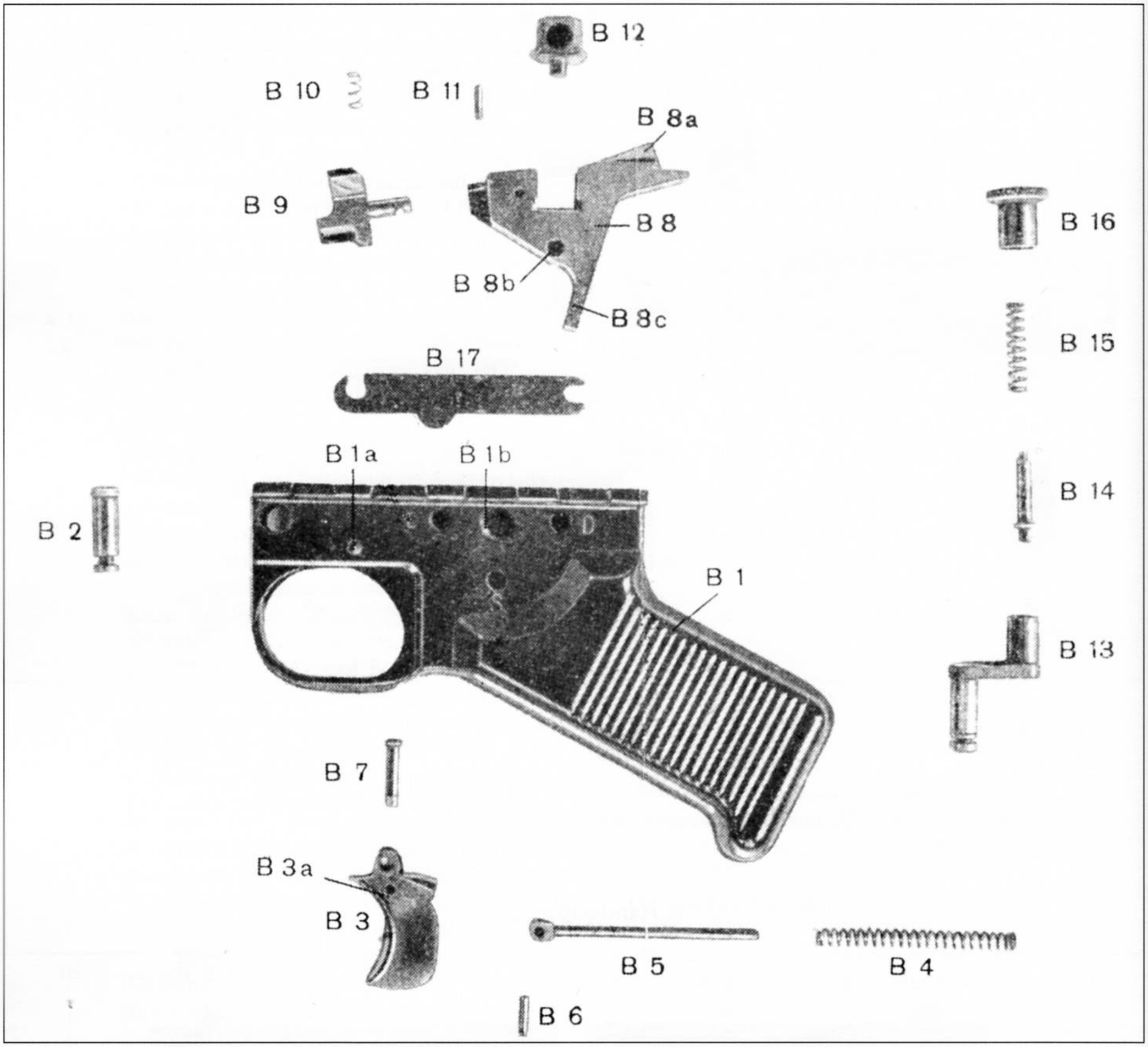
The gas cylinder (A39) is inserted through the lower holes of the gas block/bipod mount and the handguard, and is secured by the threaded plug (A19), the front end of which forms a six-sided mounting nut, hollowed out to receive the point of the stowed bayonet (G). The slotted rear end of the gas cylinder (A39) is secured against turning by a pin rivetted into the front of the receiver.

The gas block/bipod mount has a lug (A13a) on either side to which are rotatably mounted the bipod legs (A20 and A21) by means of the bipod leg retaining pins (A22). In the upper part of the legs are the detent springs (A23), which hold the legs in the deployed position. On the underside of the bipod mount is a lug (A13b) for the attachment of the snap hook (F2) of the sling (F).

B. Handgrip assembly



28. Figs 11 and 12 from the first edition of D. (Luft) T.6194.
Left: left side view of FG42 type 'D' handgrip assembly, with fire selector set at 'D' for full-automatic fire.
Right: right side view of type 'D' handgrip assembly. Note the first appearance of the handgrip pin retaining plate (B17).



29. Fig 14 from the first edition of D. (Luft) T.6194: left side view of FG42 type 'D' handgrip assembly, stripped.

The handgrip assembly contains the trigger mechanism and consists of the following:

Handgrip	B1
Handgrip retaining pin	B2
Trigger	B3
Trigger spring	B4
Trigger spring guide	B5
Trigger spring guide axis pin	B6
Trigger axis pin	B7
Trigger lever	B8

Interruptor	B9
Interruptor spring	B10
Interruptor retaining pin	B11
Trigger lever bearing	B12
Safety/fire selector	B13
Fire selector detent	B14
Fire selector detent spring	B15
Fire selector detent head	B16
Handgrip pin retaining plate	B17

The handgrip assembly is located in the T-slot (A1f) on the underside of the receiver, and secured by the handgrip retaining pin (B2) inserted through the receiver lug (A1e). The trigger spring (B4) and spring guide (B5) are rotatably attached to the trigger by the trigger guide axis pin (B6), and the trigger assembly is rotatably attached in the handgrip by the trigger axis pin (B7) in the hole (B1a).

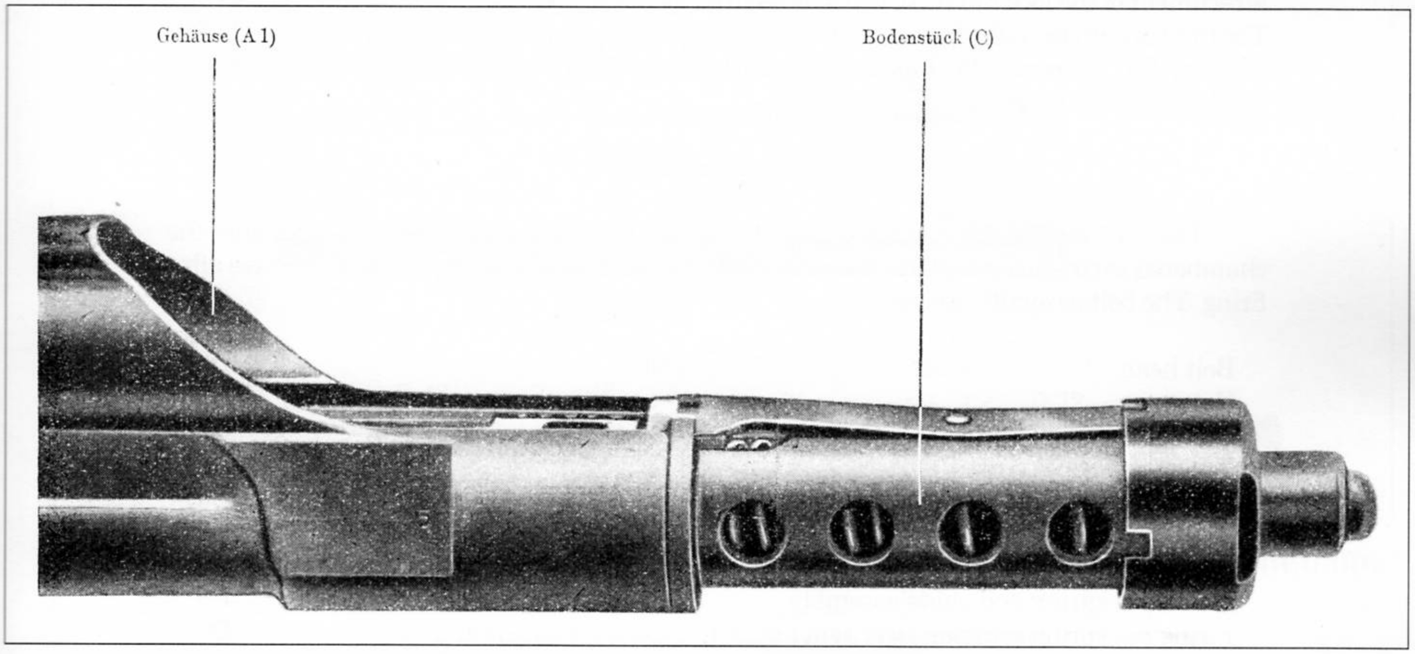
The trigger lever assembly (B8), to which is connected the interruptor (B9), the interruptor spring (B10) and the interruptor retaining pin (B11), turns on the trigger lever bearing. The shaft of the safety/fire selector passes through the hole in the bearing (B12). The upper rear of the trigger lever is configured as the sear (B8a).

The safety/fire selector (B13) is rotatably located in the hole (B1b) of the handgrip. The trigger (B3), together with its spring (B4) and guide (B5), pivots about the trigger axis pin (B7) through the hole (B3a) in the trigger, and the lower end of the trigger spring (B4) is supported by the lower arm (B8c) of the trigger lever.

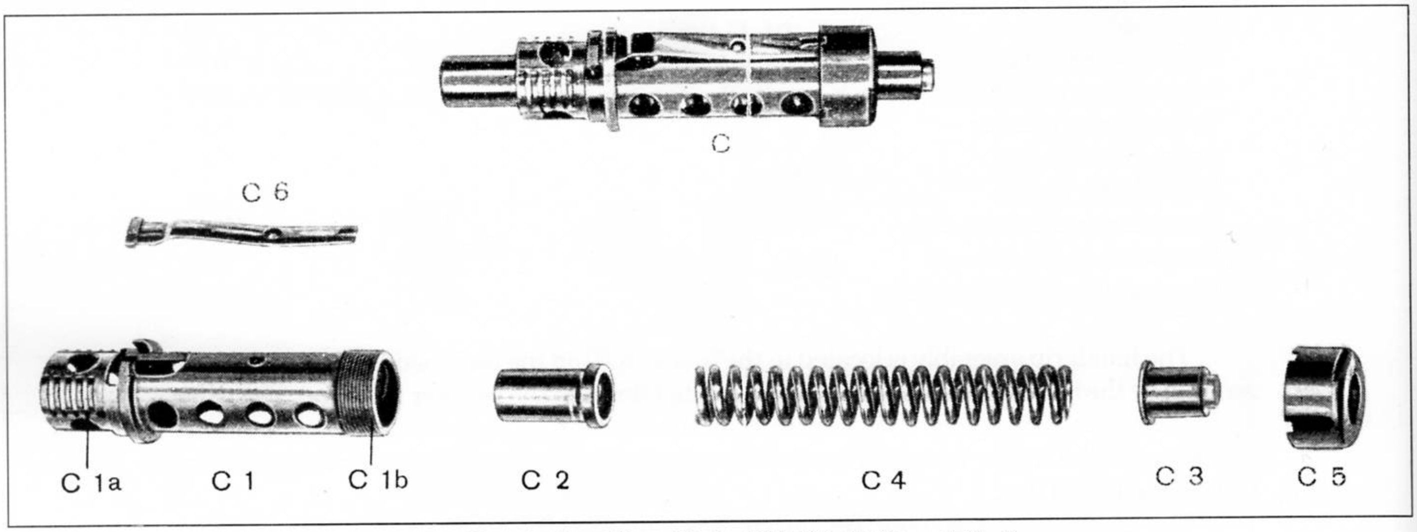
The safety/fire selector (B13) contains the detent (B14), detent spring (B15), and detent head (B16). The detent can be inserted into three holes in the handgrip to produce single fire 'E', automatic fire 'D', and safe 'S'.

To prevent their falling out, the handgrip retaining pin (B2), trigger axis pin (B7) and safety/fire selector (B13) are held in the handgrip by the handgrip pin retaining plate (B17).

C. Buffer assembly



30. Fig 15 from the first edition of D. (Luft) T.6194: FG42 type 'D' buffer assembly, installed in receiver.



31. Fig 16 from the first edition of D. (Luft) T.6194: FG42 type 'D' buffer assembly (top) and buffer components (below), disassembled.

The buffer assembly contains the buffer spring, which cushions the recoil of the weapon. It consists of:

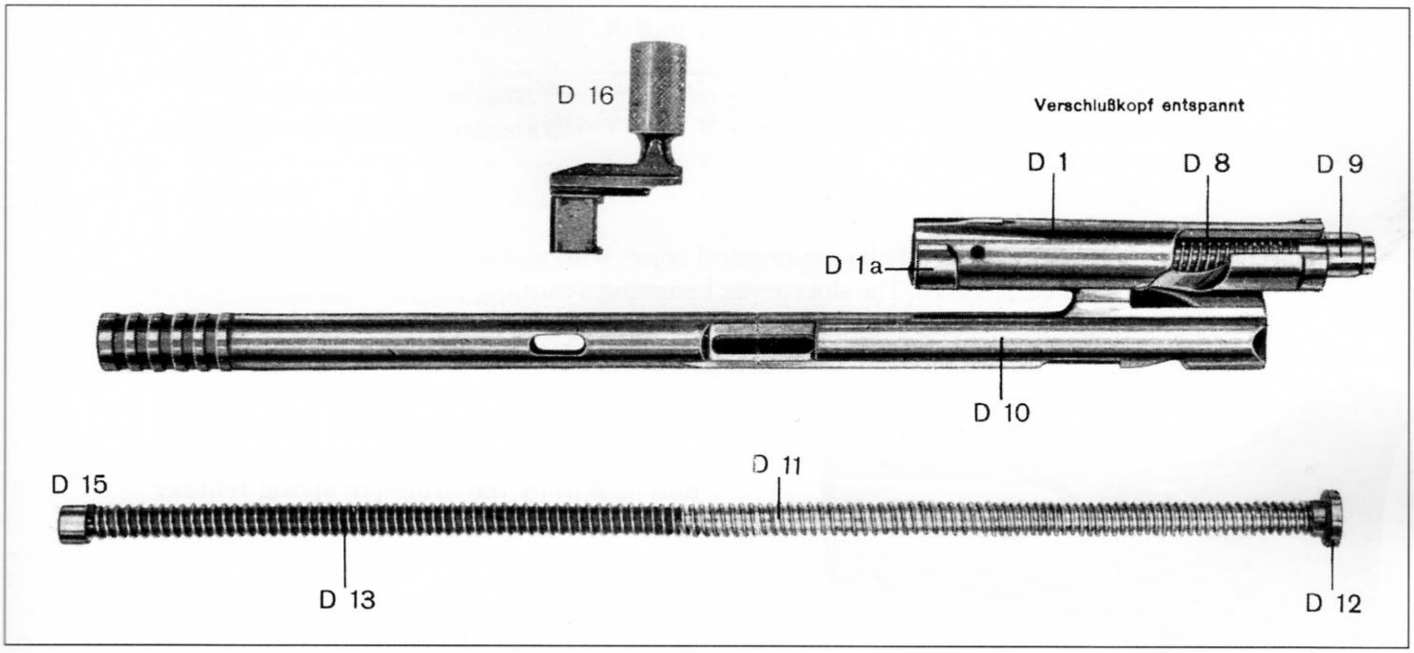
Buffer housing	C1
Buffer bushing, front	C2
Buffer bushing, rear	C3
Buffer spring	C4
Buffer lock nut	C5
Buffer lock spring	C6

The buffer housing (C1) has three sets of interrupted threads (C1a) which mate with the interrupted threads (A1k) in the receiver. The rear of the buffer housing is threaded for attachment of the lock nut (C5), which is secured by the rear end of the buffer lock spring (C6). The front end of the buffer lock spring locks the buffer assembly in the receiver. The front buffer bushing (C2), the rear buffer bushing (C3) and between them the buffer spring (C4) are inserted inside the buffer housing.

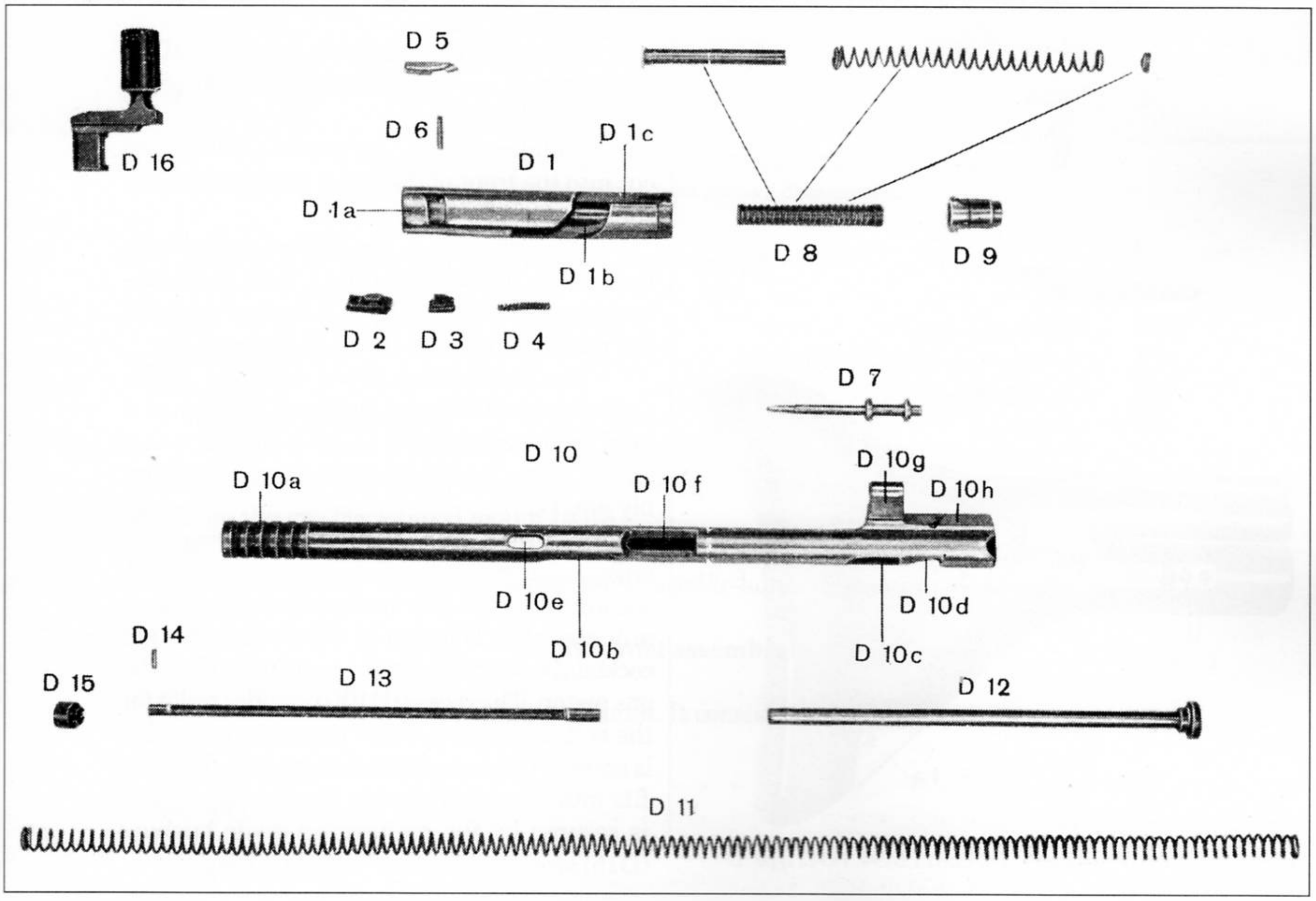
D. Bolt assembly

The bolt guides the cartridge into the barrel and locks the breech. It detonates the chambered cartridge and effects the extraction and ejection of the empty cartridge case after firing. The bolt assembly consists of:

Bolt head	D1
Extractor	D2
Extractor keeper	D3
Extractor keeper spring	D4
Ejector	D5
Ejector retaining pin	D6
Firing pin	D7
Firing pin spring and guide assembly	D8
Firing pin spring retainer	D9
Gas piston	D10



32. Fig 17 from the first edition of D. (Luft) T.6194: FG42 type 'D' bolt assembly, showing bolt in locked position.



33. Fig 18 from the first edition of D. (Luft) T.6194: FG42 type 'D' bolt assembly components, disassembled.

Mainspring	D11
Mainspring guide	D12
Mainspring guide rod	D13
Mainspring assembly pin	D14
Mainspring guide bushing	D15
Cocking handle	D16

The bolt head (D1) is a hollow cylindrical object with a straight slot (D1C), open to the rear, cut in its circumference. The slot curves, becoming a cam slot (D1b), which terminates in another straight slot ending slightly more than halfway up the length of the bolt head. The slot (D1c – D1b) receives the yoke (D10g) of the gas piston (D10) carrying the firing pin (D7). The firing pin spring and guide assembly (D8) are inserted into the bolt head from the rear and held in by the firing pin spring retainer (D9).

The rear of the bolt head rests on the support (D10h).

On the outer circumference of the front of the bolt head are two opposing locking lugs (D1a). The extractor (D2), together with its keeper (D3) and spring (D4), sits in a recess between these lugs.

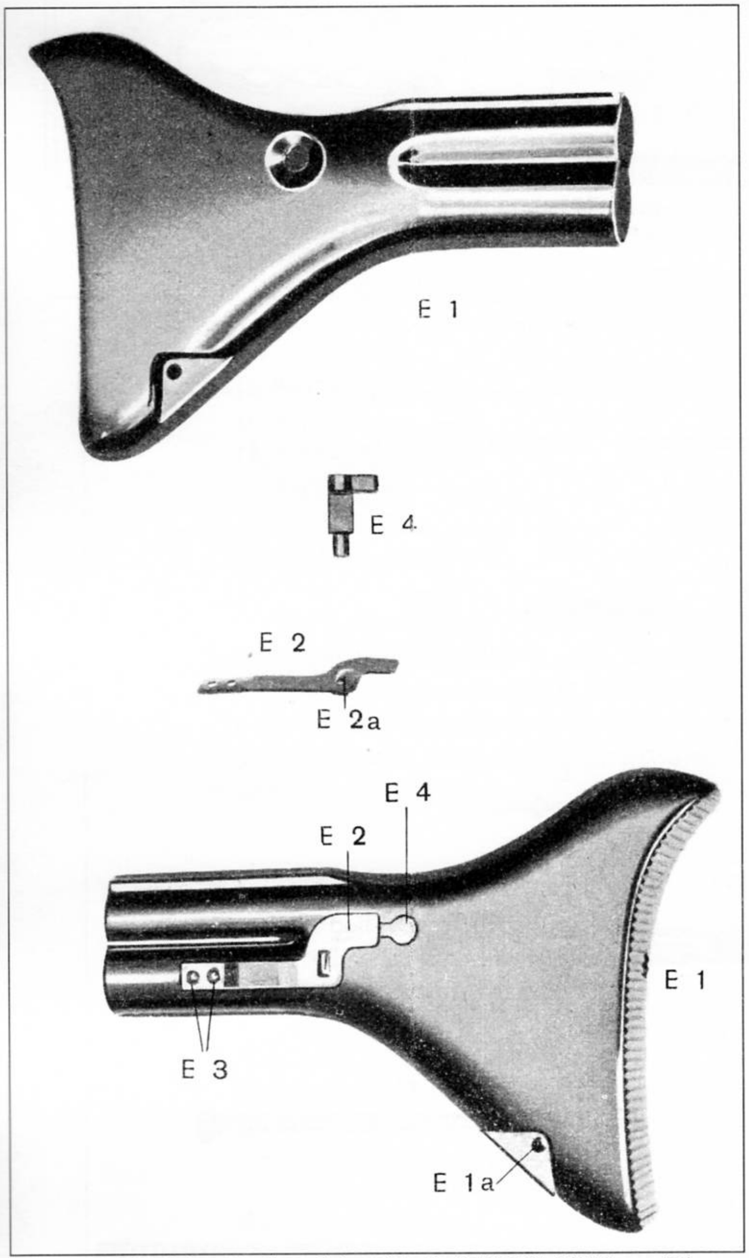
Opposite the extractor is the ejector (D5), moving in a curved slot and secured by its retaining pin (D6).

Annular gas sealing grooves (D10a) are cut into the front of the outer circumference of the gas piston.

The interior of the hollow gas piston houses the mainspring (D11), with the mainspring guide bushing (D15) at its front end and the mainspring guide (D12) at the rear.

The mainspring slides over the mainspring guide (D12) and guide rod (D13) and is held in the assembled position by the mainspring guide bushing and mainspring assembly pin (D14).

The sear (B8a) of the trigger lever (B8) engages the gas piston recesses (D10b or D10c), according to the fire mode (single fire 'E' or automatic fire 'D') selected. When the bolt is not cocked the sear rests in the notch (D10d) of the gas piston. The recess (D10f) provides a slot for the bolt stop (A5) to enter when the magazine is empty. The base of the cocking handle (D16) fits into the slot (D10e) in the gas piston, and is secured by the mainspring guide bushing (D15) seating in its rear recess (D16a).



34. Fig 19 from the first edition of D. (Luft) T.6194: FG42 type 'D' butt assembly.
Above: right side view.
Centre: locking components, disassembled.
Below: left side view.

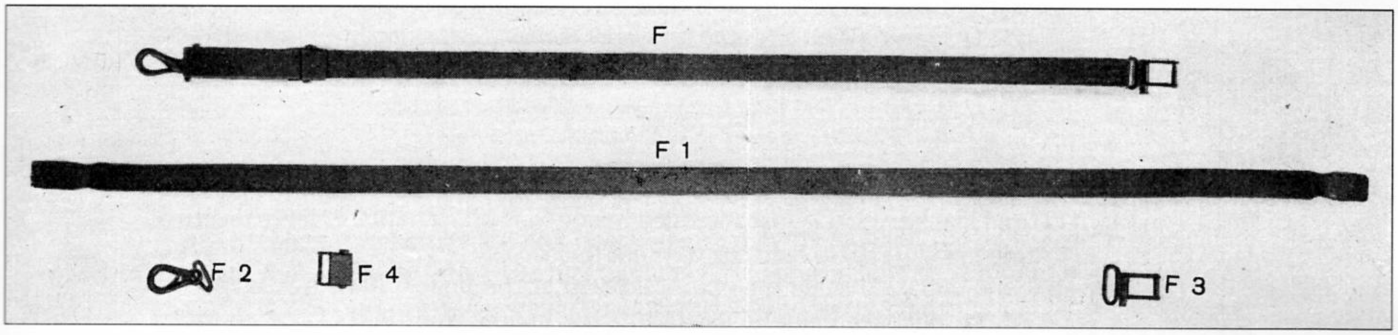
E. Butt assembly

The buttstock is slid over the rear of the receiver (A1) and serves to hold the weapon against the shoulder. It consists of:

Buttstock	E1
Buttstock lock spring	E2
Buttstock lock spring rivet (2)	E3
Buttstock lock release button	E4

The buttstock (E1) is slid over the rear of the receiver. On the inside of the buttstock lock spring (E2), which is flexibly rivetted to the buttstock by the rivets (E3), is the lock (E2a) which snaps into the buttstock locking recess (A1i) of the receiver. The release button (E4) pushes against the lock spring (E2). The hole (E1a) in the buttstock receives the sling clip (F3).

F. Sling assembly



35. Fig 20 from the first edition of D. (Luft) T.6194: FG42 type 'D' sling assembly (above) and sling components (below), disassembled.

The sling serves to carry the weapon. It consists of:

Sling	F1
Sling snap hook	F2
Sling clip	F3
Sling keeper assembly	F4

At the front end of the sling (F1) is the snap hook (F2), which is snapped into the lug (A13b) on the gas block/bipod mount (A13).

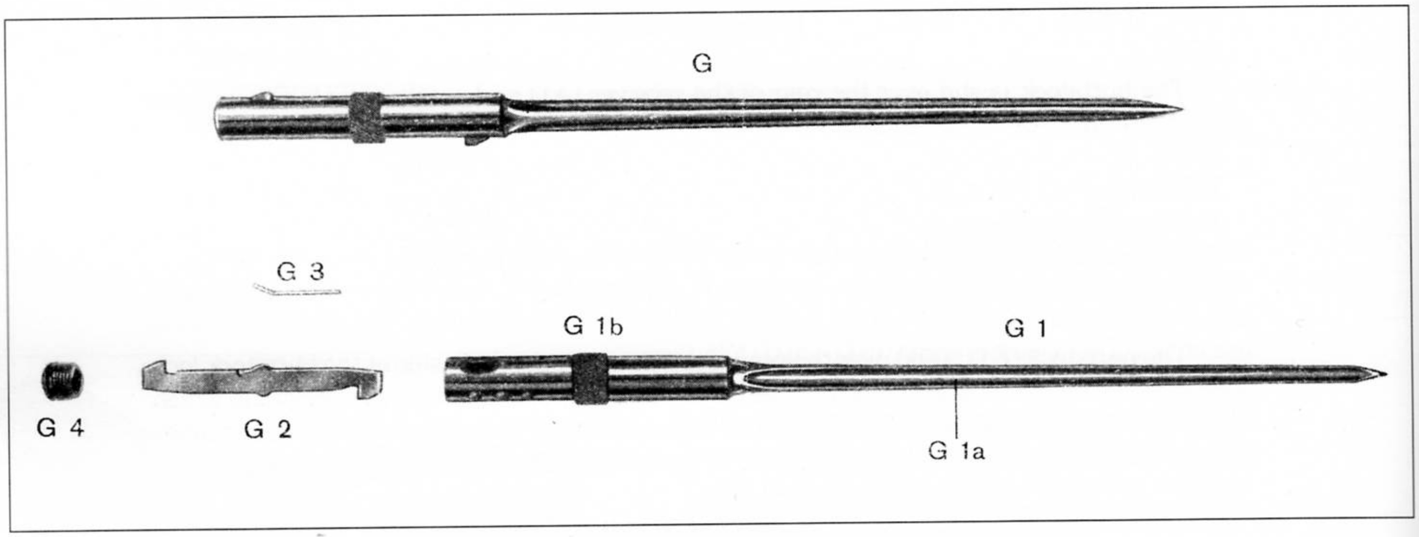
At the other end of the sling is the sling clip (F3), which is attached through the hole (E1a) of the buttstock (E1). The sling keeper (F4) is used to adjust the length of the sling.

G. Bayonet assembly

The bayonet is mounted for close combat. It consists of the following parts:

Bayonet blade	G1
Bayonet lock	G2
Bayonet lock spring	G3
Bayonet end cap	G4

The cruciform bayonet blade (G1) has four grooves in cross section (G1a); a raised ring



36. Fig 21 from the first edition of D. (Luft) T.6194, showing the FG42 type 'D' bayonet, a direct copy of the fluted-blade bayonet as used on the French bolt-action MAS M1936 rifle.
Above: bayonet assembly.
Below: bayonet components, disassembled.

(G1b) provides a grip while mounting.

The lock (G2) and lock spring (G3) are mounted inside the hollow haft and serve together with the raised knurled ring (G1b) to hold the bayonet in position.

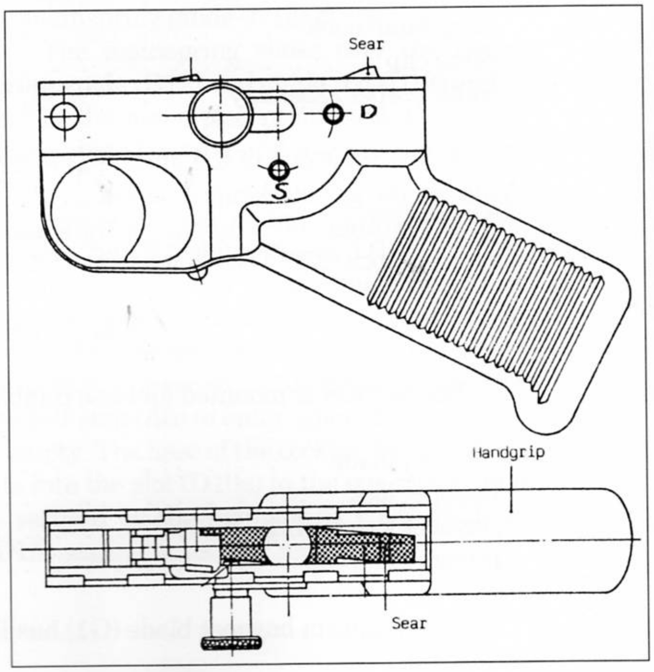
The threaded end cap (G4) seals the open rear end of the hollow haft. In the stowed position the point of the bayonet blade is located in the hollow front end of the six-sided mounting nut formed on the gas cylinder plug (A19).

IV. Method of Operation

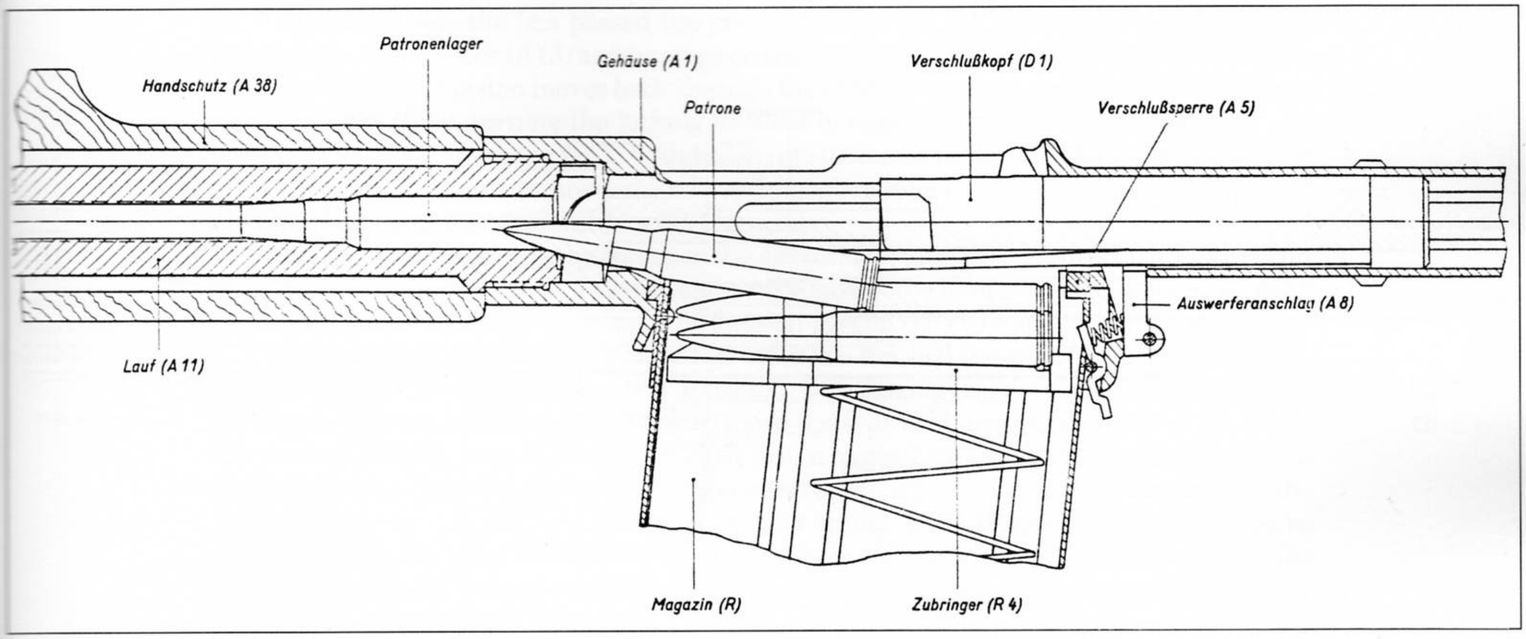
A. Single fire

The safety/fire selector is set for 'E' single fire. In this position, the fire selector detent (B14) moves the rear of the trigger lever (B8) with its sear (B8a) to the left on the bearing (B12). The sear is now in the path of the single fire recess (D10c) of the gas piston. At the same time, the fire selector detent (B14) has moved the interruptor (B9) on the front of the trigger lever to the right, where it lies with its lower edge on the trigger (B3), while its upper edge is within the track of the gas piston.

The bolt is forward and locked. A loaded magazine is inserted. By pulling back the cocking handle (D16) a round is loaded; that is:

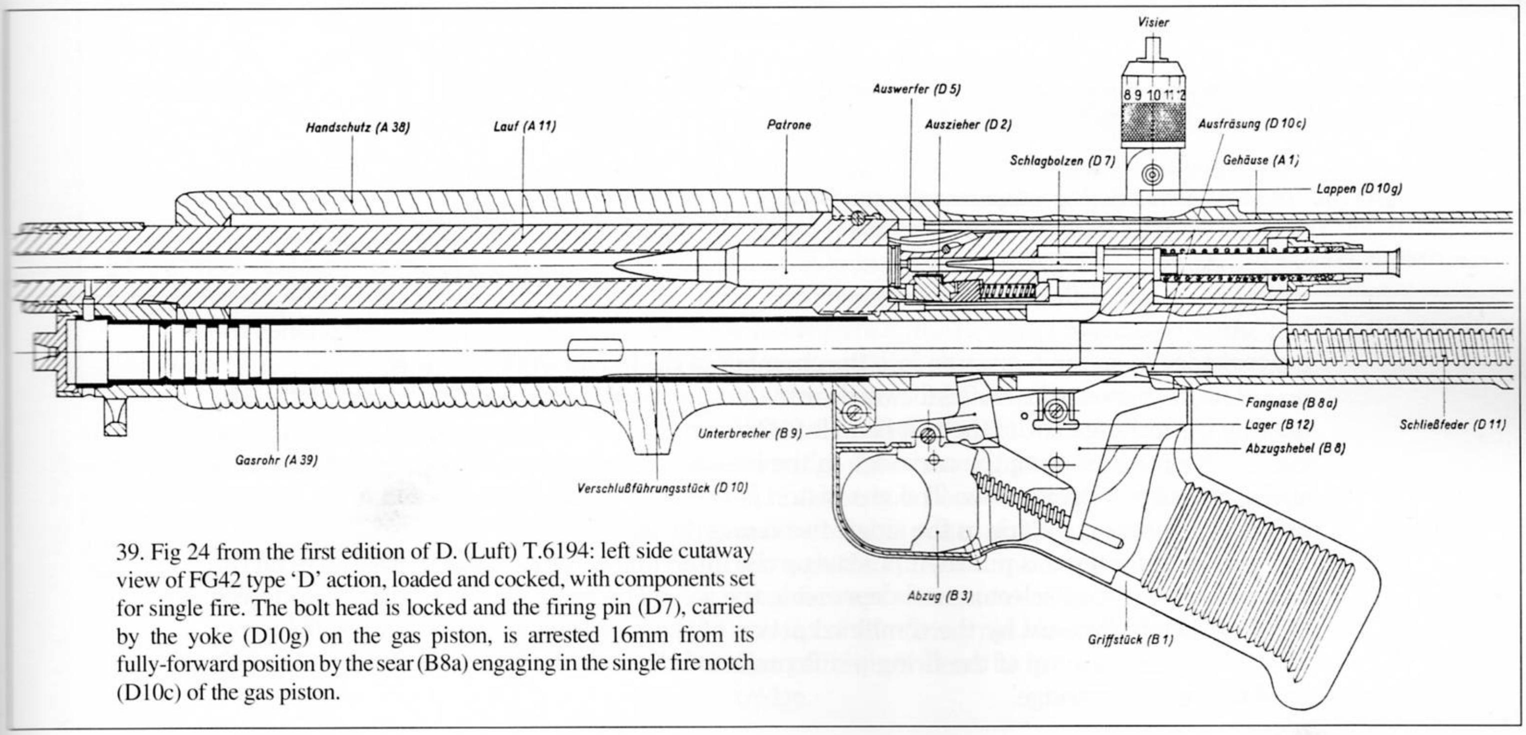


37. Fig 22 from the first edition of D. (Luft) T.6194.
Above: left side view of FG42 type 'D' handgrip, with fire selector set at 'E' for single fire.
Below: top view of handgrip assembly set for single fire. Note the position of the sear (B8a) and the interruptor (B9), located at the front end of the trigger lever.

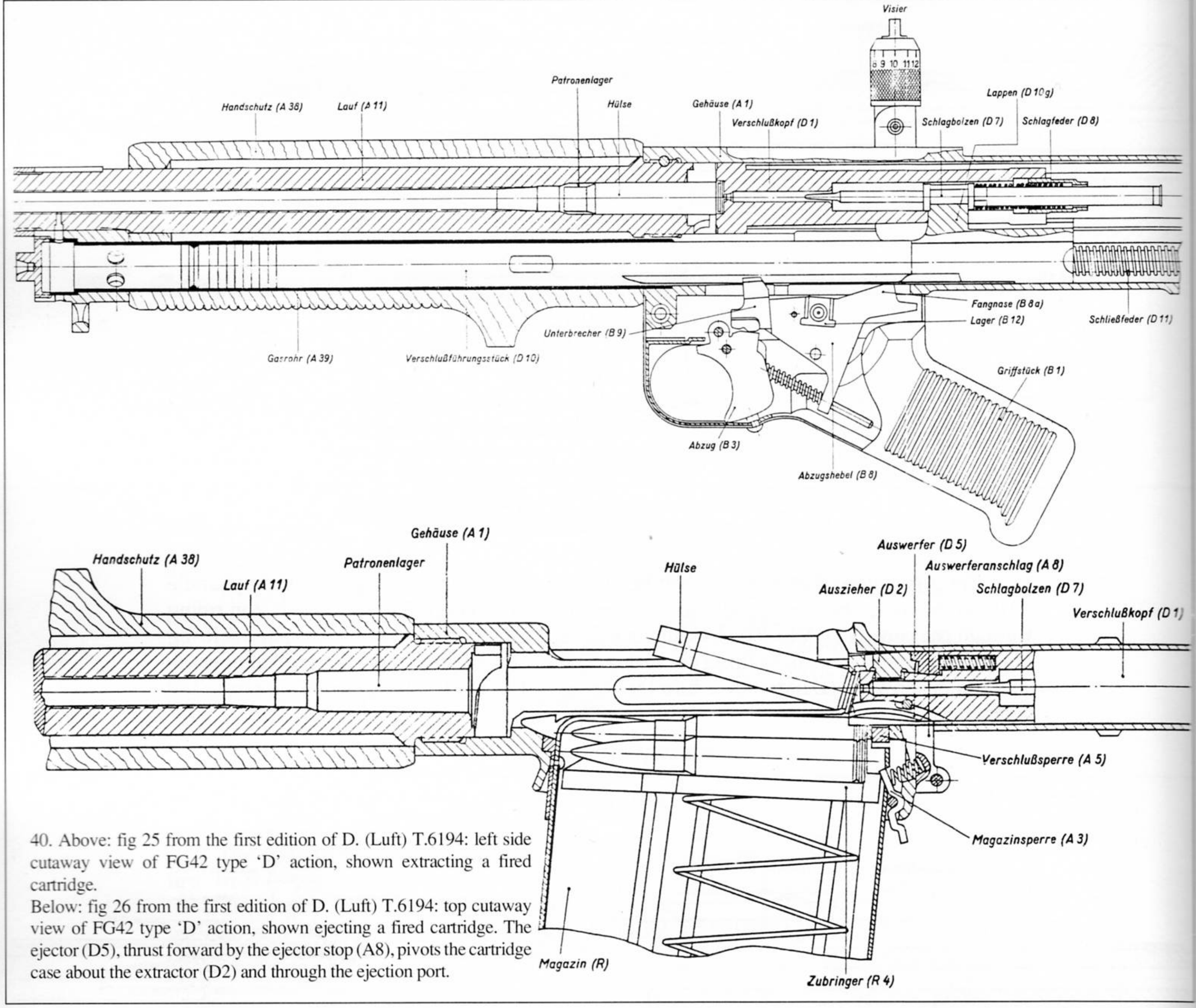


38. Fig 23 from the first edition of D. (Luft) T.6194: top cutaway view of FG42 type 'D' action, shown feeding a cartridge from the magazine.

The gas piston (D10) with the bolt head (D1) are moved by pulling the cocking handle (D16) to the rear, whereby the bolt head is turned by the yoke (D10g) of the gas piston riding through the cam slot (D1b). The locking lugs (D1a) on the bolt head are unlocked, the firing pin (D7) is withdrawn and the firing pin spring (D8) and the mainspring (D11) are compressed. The gas piston yoke (D10g) moves into the straight slot (D1c), holding the firing pin in the cocked position.



39. Fig 24 from the first edition of D. (Luft) T.6194: left side cutaway view of FG42 type 'D' action, loaded and cocked, with components set for single fire. The bolt head is locked and the firing pin (D7), carried by the yoke (D10g) on the gas piston, is arrested 16mm from its fully-forward position by the sear (B8a) engaging in the single fire notch (D10c) of the gas piston.



40. Above: fig 25 from the first edition of D. (Luft) T.6194: left side cutaway view of FG42 type 'D' action, shown extracting a fired cartridge.
Below: fig 26 from the first edition of D. (Luft) T.6194: top cutaway view of FG42 type 'D' action, shown ejecting a fired cartridge. The ejector (D5), thrust forward by the ejector stop (A8), pivots the cartridge case about the extractor (D2) and through the ejection port.

As it returns to battery from its rearmost position, the bolt head in passing pushes the top cartridge from the magazine into the chamber of the barrel (A11).

The gas piston yoke moves forward out of the straight slot and through the cam slot (D1b), turning the locking lugs on the bolt head into the cams (A11c) in the rear of the barrel, locking the bolt head and sealing the cartridge in the breech; the extractor (D2) engaging the groove of the cartridge with its claw. The gas piston is arrested 16mm from the end of its forward travel by the sear engaging in the single fire recess (D10c).

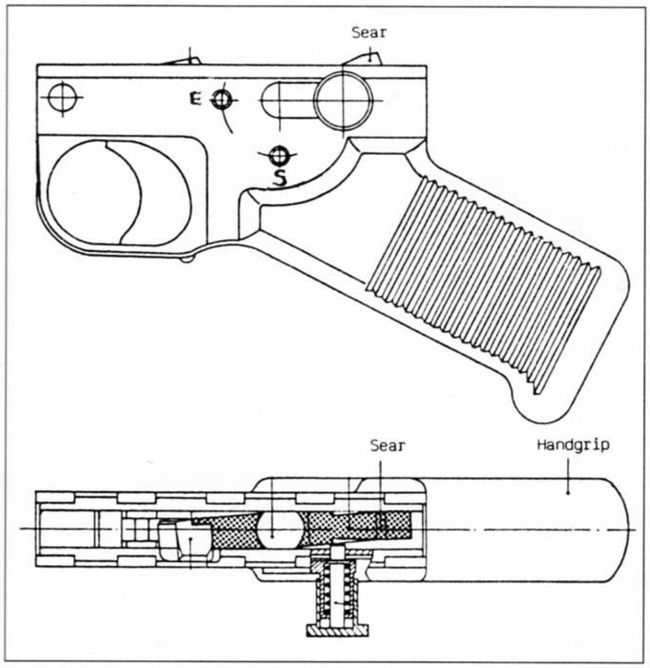
When the trigger is pulled, it pushes up the interruptor, rotating the trigger lever on the axle of the safety/fire selector, and depressing the sear. The gas piston is released and forced the final 16mm forward by the combined action of the mainspring (D11) and the firing pin spring (D8), and the tip of the firing pin is projected through the hole in the face of the bolt head to fire the cartridge.

After the projectile has passed the gas port (A11d) in the barrel, gases flow into the chamber in the gas block (A13) and impinge on the front of the gas piston, driving it to the rear. The yoke on the gas piston moves back through the straight cam slot and into the curved cam slot of the bolt head, turning the locking lugs out of engagement with the barrel cams and unlocking the bolt. The firing pin is withdrawn into its recess in the bolt head, the mainspring and firing pin spring are compressed, and the firing pin is held in the cocked position. The fired cartridge case is carried rearward by the extractor.

As the fired case clears the chamber the ejector (D5) comes into contact with the ejector stop (A8). The ejector is thrust forward against the base of the fired cartridge, pivoting it about the extractor and throwing it through the ejection port on the right side of the weapon.

Meanwhile the upper edge of the interruptor has reached the end of its free travel in the track in the gas piston and is cammed to the left, disengaging its lower edge from the step in the trigger and freeing the trigger lever to move the sear back up into the path of the single fire recess (D10c) of the gas piston. As the gas piston moves forward the sear engages with the single fire recess, and the upper edge of the interruptor, again aligned with the track in the gas piston, is moved to the right by the interruptor spring (B10). However the trigger must be released before the next shot can be fired, as only by this action can the lower edge of the interruptor snap up behind the step in the trigger to effect a connection between the trigger and the sear of the trigger lever.

B. Automatic fire

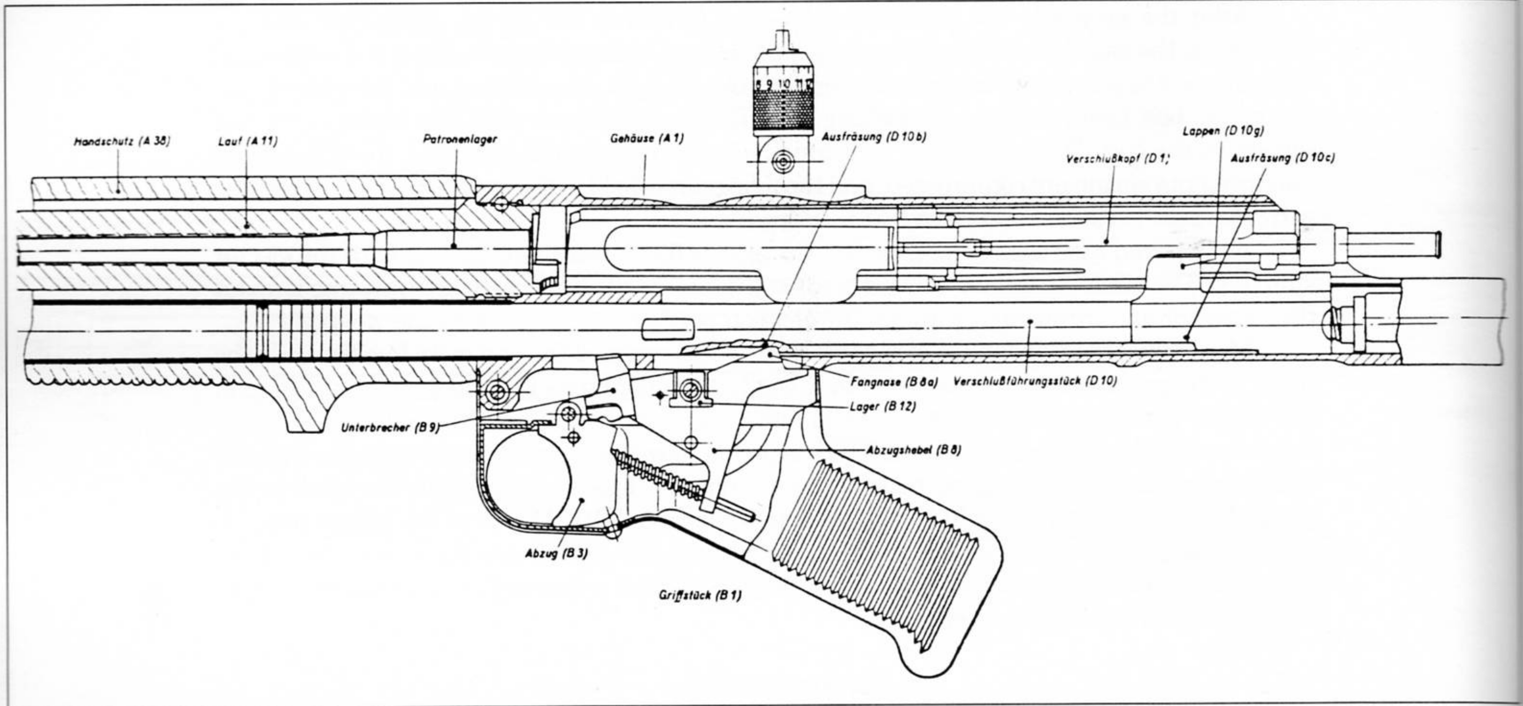


41. Fig 27 from the first edition of D. (Luft) T.6194.
Above: left side view of handgrip with fire selector set at 'D' for automatic fire.
Below: top view of handgrip assembly set for automatic fire. Compare with fig 37: note the repositioning of the sear (B8a) and the interruptor (B9).

The fire selector detent head (B16) is pulled outwards and the safety/fire selector (B13) is turned to 'D' for automatic fire. In this position, the fire selector detent (B14) pushes on the rear of the trigger lever, pivoting it to the right on the bearing, and positioning the sear in the path of the automatic fire recess (D10b) in the gas piston. At the same time, the interruptor (B9) on the front of the trigger lever is pivoted to the left, out of the path of the gas piston.

By pulling back the cocking handle (D16) the bolt head is unlocked and the bolt assembly is cocked and drawn to the rear as before, except that now the sear engages with the automatic fire recess (D10b) in the gas piston, holding the bolt assembly in the rearward, cocked position.

When the trigger is pulled, the sear is withdrawn from the automatic fire recess in the gas piston, and the bolt assembly is propelled forward by the action of the compressed mainspring (D11). The face of the bolt head pushes the top cartridge from the magazine into the chamber (A11a), the bolt head is turned and locked by the action of the yoke of the gas piston moving through the curved camming slot (D1b), and the final forward movement of the gas piston carries the tip of the firing pin through the hole in the face of the bolt head to fire the chambered cartridge.



42. Fig 28 from the first edition of D. (Luft) T.6194: left side cutaway view of FG42 type 'D' action, cocked. With components set for automatic fire, the bolt assembly is held in the rear position by the sear (B8a) engaging in the automatic fire recess (D10b) of the gas piston.

The unlocking of the bolt head and the rearward stroke of the action are effected as before, but in the automatic mode as long as the trigger is held down and ammunition remains in the magazine, the weapon will continue to fire. If the trigger is released, firing is interrupted by the sear rising into the path of and entering the automatic fire recess (D10b) in the gas piston, catching and holding the bolt assembly in the rearward, cocked position.

C. Method of operation of the bolt stop

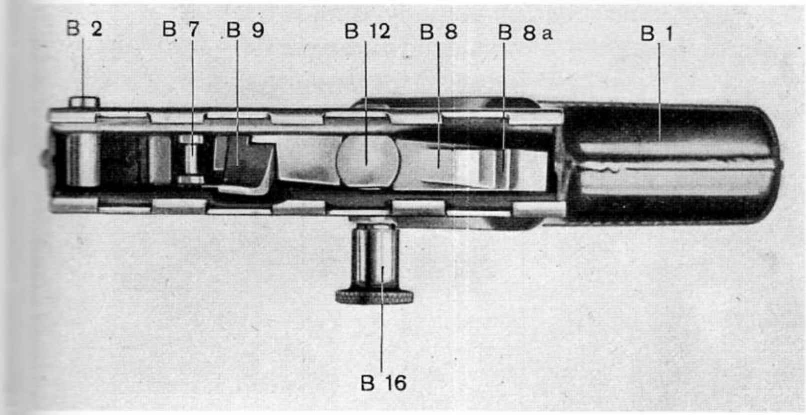
When the magazine is emptied by either single or automatic fire, the nose (R4a) of the magazine follower pushes the bolt stop (A5) into the path of the gas piston where it engages the recess (D10f). When a full magazine is inserted, the bolt is pulled to the rear by the cocking handle and the bolt stop spring (A7) withdraws the bolt stop. The weapon is now ready to fire.

D. Method of operation of the recoil buffer and buttstock

In order to reduce the effects of recoil in firing, the weapon is mounted in the buttstock over the recoil buffer in a mobile manner. The damping of the recoil forces is effected by the buffer spring in the buffer housing.

E. Securing the weapon

When the safety/fire selector (B13) is turned to the 'S' position, the detent (B14) enters the hole (B8b) in the trigger lever to prevent the trigger lever from moving when the trigger is pulled.



43. Fig 13 from the first edition of D. (Luft) T.6194: top view of FG42 type 'D' handgrip assembly, with fire selector detent head (B16) set at 'S' for safe. In this position the fire selector detent (B14; fig 29) rests in the hole (B8b; fig 29), locking the trigger lever (B8) and preventing it from moving.

V. Employment

A. Preparing the weapon for firing

The mechanism of the FG42 and especially the bolt is to be very carefully examined for proper functioning, and has to be well oiled with "Blue Gun Oil" (*Waffenöl Blau*). New guns should be well cleaned with rust preventative "Oil 39" and then lubricated with *Waffenöl Blau*. The weapon should be checked by being cocked and then uncocked carefully several times without the magazine being inserted. Never dry-fire the weapon. Then a loaded magazine, held in the left hand, is snapped into the magazine well nose forwards and then turned to the rear until the magazine catch engages. The weapon is cocked and loaded and put on safe.

B. During firing

The handling of the weapon is clearly shown in [various illustrations throughout this book]. In single fire, the trigger must be released after each shot. In the automatic fire mode, the weapon continues to fire as long as the trigger is depressed and there are rounds in the magazine. When the magazine is empty, the bolt is held by the bolt stop and stays open. A full magazine is inserted and the cocking handle has to be pulled back before resuming firing.

The gun can be fired with the bayonet attached.

C. After firing

Remove the magazine. Pull the bolt back and ensure that the chamber is clear, then pull the trigger and slowly let the bolt slide forward again.

VI. Servicing

The FG42 must be well cared for, so that its components will function reliably and safely as long as possible. Check all parts frequently for wear or damage.

A. Cleaning

If the gun has not been fired, it need only be kept free of dust, dirt and dampness. Disassembly is not necessary for this, although the bore and chamber of the barrel and the bolt head must be kept clean and freshly oiled with *Waffenöl Blau*.

After every firing a major cleaning is needed, especially the bolt, buffer assembly and gas cylinder. (Section VII. Maintenance, below, shows how to disassemble the gun). The working parts have to be very carefully cleaned and oiled and inspected for cracks and breakages. Damaged parts must be replaced.

B. Reconditioning by Armourer artificer

After firing 5,000 to 7,000 rounds*, or if the gun does not function properly, it must be sent to the Armourer artificer for inspection and repair. Using the criteria found in section II. Technical Data (above), the barrel and bolt are gauged and the mainspring and firing pin spring measured to determine their remaining service life.

The parts that were not disassembled during major cleaning are also carefully checked by the Armourer artificer. As far as possible, riveted parts should not be disassembled.

*) Snipers' rifles (those with telescopic sight) must have especially good bores. To verify this, regularly observe the accuracy of fire.

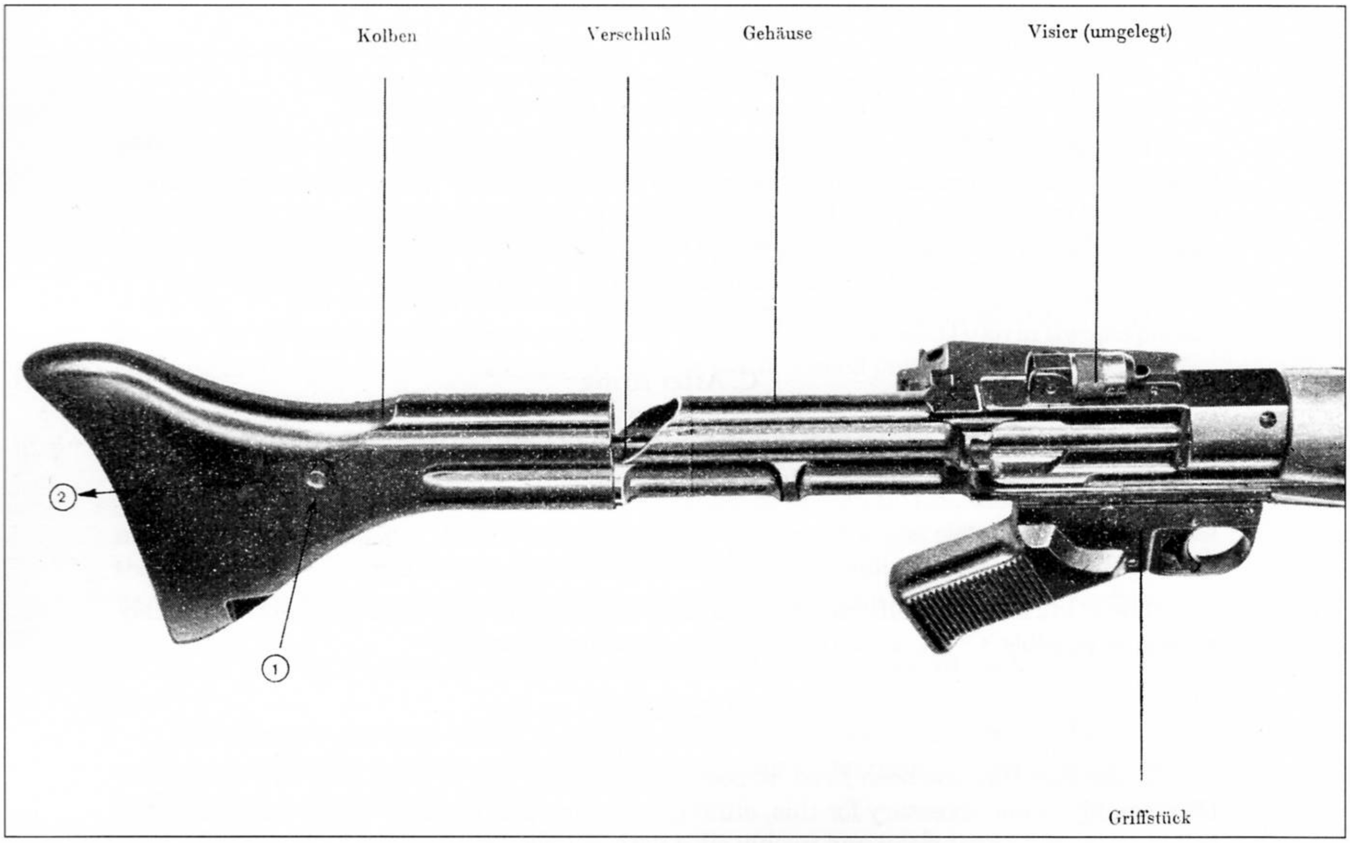
VII. Maintenance

The shooter is only permitted to perform those maintenance operations indicated by [bold text].

A. Disassembly and assembly

1. Disassembly of the weapon into its main groups.

For disassembly take the weapon in the left hand with the muzzle pointing forwards!

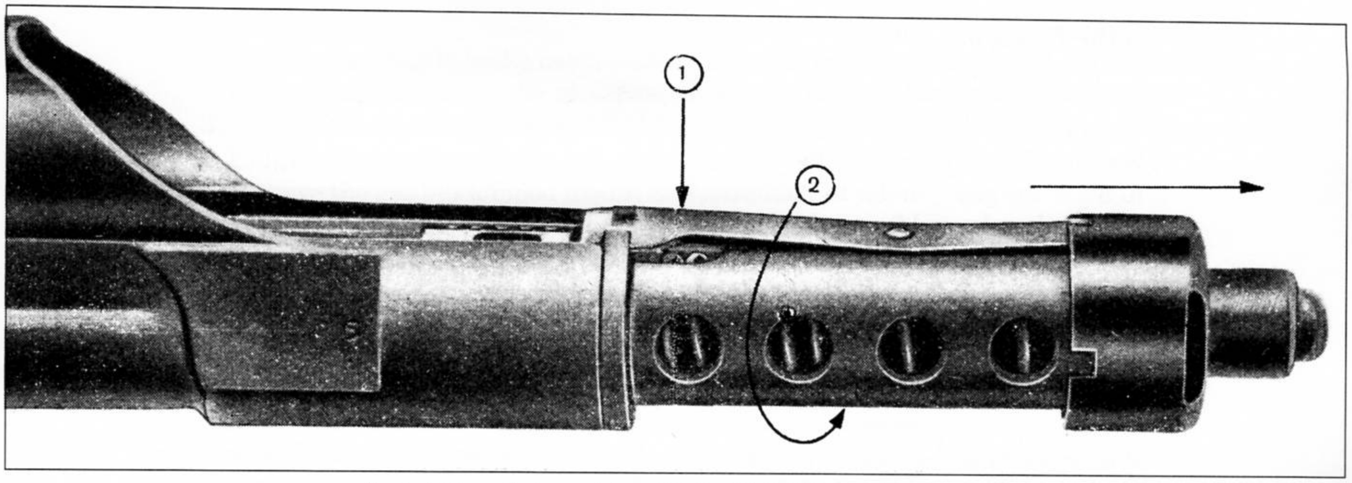


44. Fig 32 from the first edition of D. (Luft) T.6194, showing removal of the buttstock of the type 'D' FG42.

a.) Remove the buttstock:

1. Press the release button on the buttstock with the thumb of the right hand and–

2. Pull the buttstock to the rear.

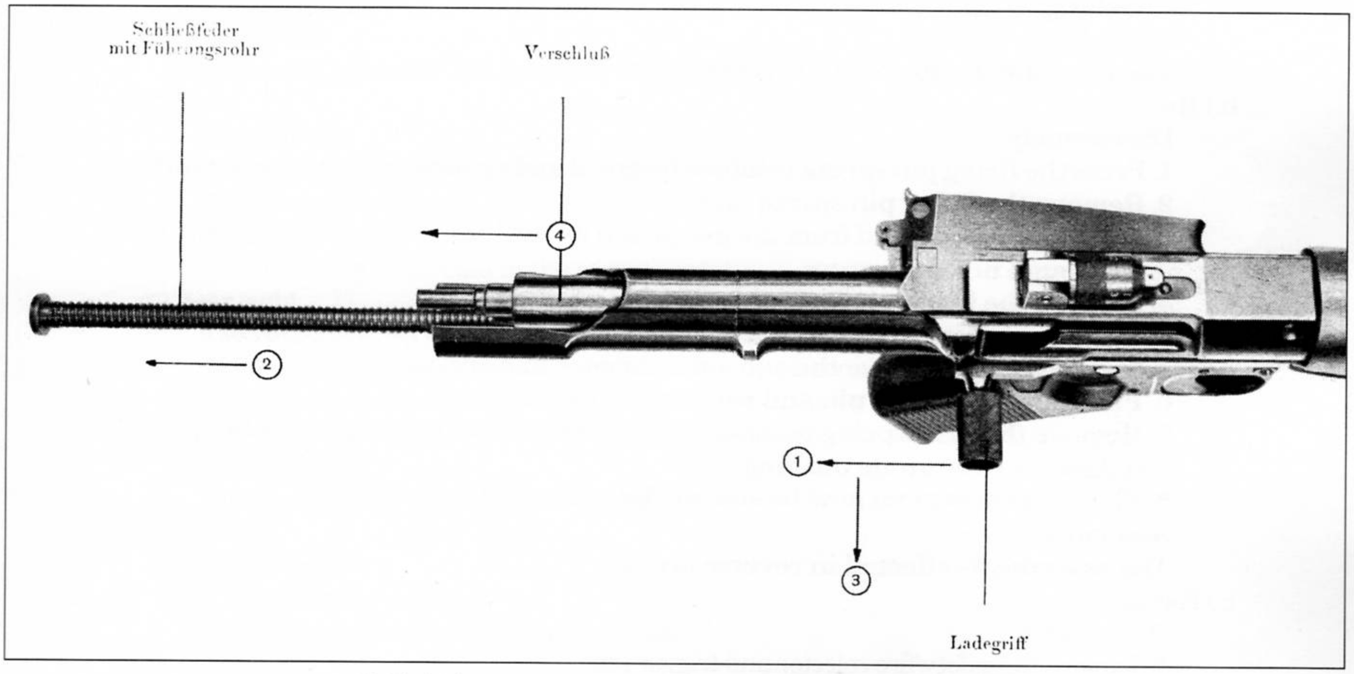


45. Fig 33 from the first edition of D. (Luft) T.6194, showing removal of the buffer assembly of the type 'D' FG42.

b.) Remove the buffer assembly:

1. Grasp the buffer assembly with the right hand, depress the front of the buffer lock spring with the thumb, and–

2. Turn the buffer assembly to the right or left until it can be removed to the rear.



46. Fig 34 from the first edition of D. (Luft) T.6194, showing removal of the mainspring and bolt assembly of the type 'D' FG42.

c.) Remove the bolt assembly:

1. Pull the cocking handle back to the end of its slot.

2. Pull the mainspring assembly back slightly.

3. Remove the cocking handle to the right.

4. Grasp the bolt head and pull the bolt assembly out to the rear, then uncock the bolt head by turning it toward the right, carefully releasing the tension

in the firing pin spring.

d.) Remove the handgrip:

1. Press in the bayonet lock and remove bayonet.
2. Open the bipod legs and expose the gas cylinder plug.
3. Remove the gas cylinder plug.
4. Remove the gas cylinder to the front.
5. Pull the handguard forward until it clears the handgrip.
6. Press in the handgrip pin retaining plate, rotate it downward and remove to the front.
7. Remove the handgrip retaining pin.
8. Slide the handgrip forwards and remove from the receiver slot.

The assembly is effected in the reverse order, however it should be noted:

1. When installing the gas cylinder, take care to align the long slot for the cocking handle with the slot in the receiver.
2. When inserting the bolt into the receiver the bolt head should be cocked by pushing it forward while turning to the left and inserting. Note: in the cocked position the locking lugs are vertical.

2. Disassembly of the groups into their individual parts.

a.) Buffer assembly

Disassembly

1. **Unscrew the lock nut.**
2. **Remove the rear buffer bushing, the buffer spring and the front buffer bushing.**

Assembly

The assembly is effected in reverse order.

b.) Bolt

Disassembly

1. **Press the firing pin spring retainer forward and remove after a quarter turn.**
2. **Remove the firing pin spring and guide.**
3. **Remove the bolt head from the gas piston by pushing it forward and turning it through ninety degrees.**
4. **Remove the firing pin from the gas piston yoke.**
5. **Press the indent on the extractor keeper to the rear with the point of a cartridge, and remove the extractor, keeper and spring.**
6. **Push out the ejector pin and remove the ejector.**
7. **Remove the mainspring assembly. Push out the mainspring assembly pin and remove the guide bushing.**
8. **The mainspring can now be slid off the guide and rod.**

Assembly

The assembly is effected in reverse order.

c.) Handgrip

Disassembly

1. Remove the safety/fire selector and trigger pin.
2. Remove the trigger and trigger lever.
3. Pull the trigger spring off the spring guide.
4. Disassemble the trigger lever: Turn the bearing a quarter turn and lift off; push out the interruptor pin and remove the interruptor and its spring.
5. Disassemble the trigger: Push out the spring guide axis pin and remove the spring guide.

Assembly

The assembly is effected in reverse order.

d.) Receiver with barrel

Disassembly

1. Push in the muzzle brake catch and unscrew the muzzle brake.
2. Unscrew the muzzle brake mounting sleeve.
3. Remove the front sight/bayonet block to the front.
4. Unscrew the gas block/bipod mount lock nut.
5. Remove the gas block/bipod mount to the front.
6. Remove the handguard.
7. Remove the rear sight from the lugs on the receiver by pushing out its pivot pin.
8. Push out the magazine catch retaining pin and remove the magazine catch and ejector stop spring.
9. Push out the ejector stop pin and remove the ejector stop.
10. Push out the bolt stop pin and remove the bolt stop and spring.
11. Drive out the barrel retaining pin, unscrew and remove the barrel.

Assembly

Assembly of the receiver with barrel is effected in reverse order.

e.) Front sight/bayonet block

Disassembly

1. Press down on the front sight base and push out the sight pivot pin. Remove the sight body gradually, allowing the detent plunger spring to expand.
2. Remove the detent plunger and spring.
3. Drive the sight blade out of the sight base.
4. Remove the muzzle brake catch, plunger and spring after pushing out the muzzle brake catch pin.

Assembly

The assembly is effected in the reverse order.

f.) Bipod

Disassembly

1. Push out the bipod leg retaining pins and–
2. Remove the legs.

Assembly

The assembly is effected in the reverse order.

g.) Rear sight

Disassembly

1. Press the sight post down. Turn the locking ring through ninety degrees and remove it. Lift off the knurled elevation ring.
2. Remove the sight post with its spring and guide.

Assembly

The assembly is effected in the reverse order.

h.) Bayonet

Disassembly

1. Unscrew the end cap.
2. Depress lock with spring and pull out.

Assembly

The assembly is effected in the reverse order.

B. Stoppages and their Correction

Notice of fundamental causes:

1. Many stoppages can be avoided by keeping the weapon clean and maintained to the above instructions.

2. Only cartridges in first class condition are to be loaded into the magazine. Deformed or dirty cartridges, as well as damaged rounds with dented cases or loose bullets must be

discarded.

3. Stoppages can never be cured by the use of force.

4. Repeated stoppages can be eliminated by sending the gun to the Armourer artificer for necessary replacement of broken or damaged parts.

5. In case of repeated magazine stoppages, replace the magazine.

Additional notice! Common stoppages which can be corrected during the course of fighting are indicated [in bold type].

TYPE OF MALFUNCTION

a. Gas piston and bolt stuck in rearward position:

Cause	Correction
1. Cartridge not properly fed towards magazine mouth (jammed or stuck cartridge)	**reload**
2. Cartridge not properly guided into chamber	**reload**
3. Jammed cartridge	**remove magazine; pull rearward on cocking handle, removing the cartridge. Replace magazine and reload.**
4. Cartridge case not extracted, caused by extractor slipping off case rim, or	**remove cartridge case**
5. Extractor broken, or	replace extractor
6. Ejector damaged; extractor spring weak or broken	replace ejector or extractor

b. Failure to fire:

Cause	Correction
1. Faulty primer	**reload**
2. Primer not struck with sufficient force (dirt in bolt head)	**clean bolt**
3. Cartridge not fed; follower spring not strong enough (magazine out of position)	**change magazine**
4. Firing pin broken	replace firing pin
5. Firing pin spring broken	replace firing pin spring
6. Firing pin spring retainer lost (firing pin slack)	replace firing pin retainer
7. Yoke on gas piston broken	replace gas piston

c. Bolt stuck in forward position:

Cause	Correction
1. Very dirty or damaged chamber	**immediate action, noting that cartridge is ejected**
2. Broken bolt parts	replace with new parts
3. Buffer spring too weak or broken (excessively hard recoil)	replace buffer springs

d. Stoppages of bolt stop, trigger and magazine:

Malfunction	Cause	Correction
1. Bolt does not stay open after magazine is empty	**worn bolt stop, worn follower nose, jammed follower**, bolt stop pin lost or bolt stop spring broken	**change magazines and reload**; replace bolt stop
2. In single fire bolt does not move forward from cocked position when trigger is pulled	**interruptor is broken and not positioned over trigger**	**set on full automatic weapon will fire only full automatic!**
3. The weapon 'doubles' or provides unwanted automatic fire	fire selector detent broken or spring weak	replace fire selector or spring

Part 2

M10–42 and M20–42 10- and 20-shot Magazines

I. Employment and characteristics

The cartridge feed is effected in the FG42 by means of the 10-round magazine (M10–42) or the 20–round magazine (M20-42). These are 'flat' magazines which can be loaded by hand with all types of ammunition used in the carbine K98k. The magazines are snapped into the magazine well of the FG42.

II. Technical data

Weight:

Magazine M10-42 empty	0.185kg [.4 lb]
M10-42 loaded	0.485kg [1 lb]
Magazine M20-42 empty	0.290kg [.6 lb]
M20-42 loaded	0.818kg [1.8 lb]

Dimensions:

Magazine M10-42	30 x 90 x 100mm
Magazine M20-42	30 x 90 x 150mm

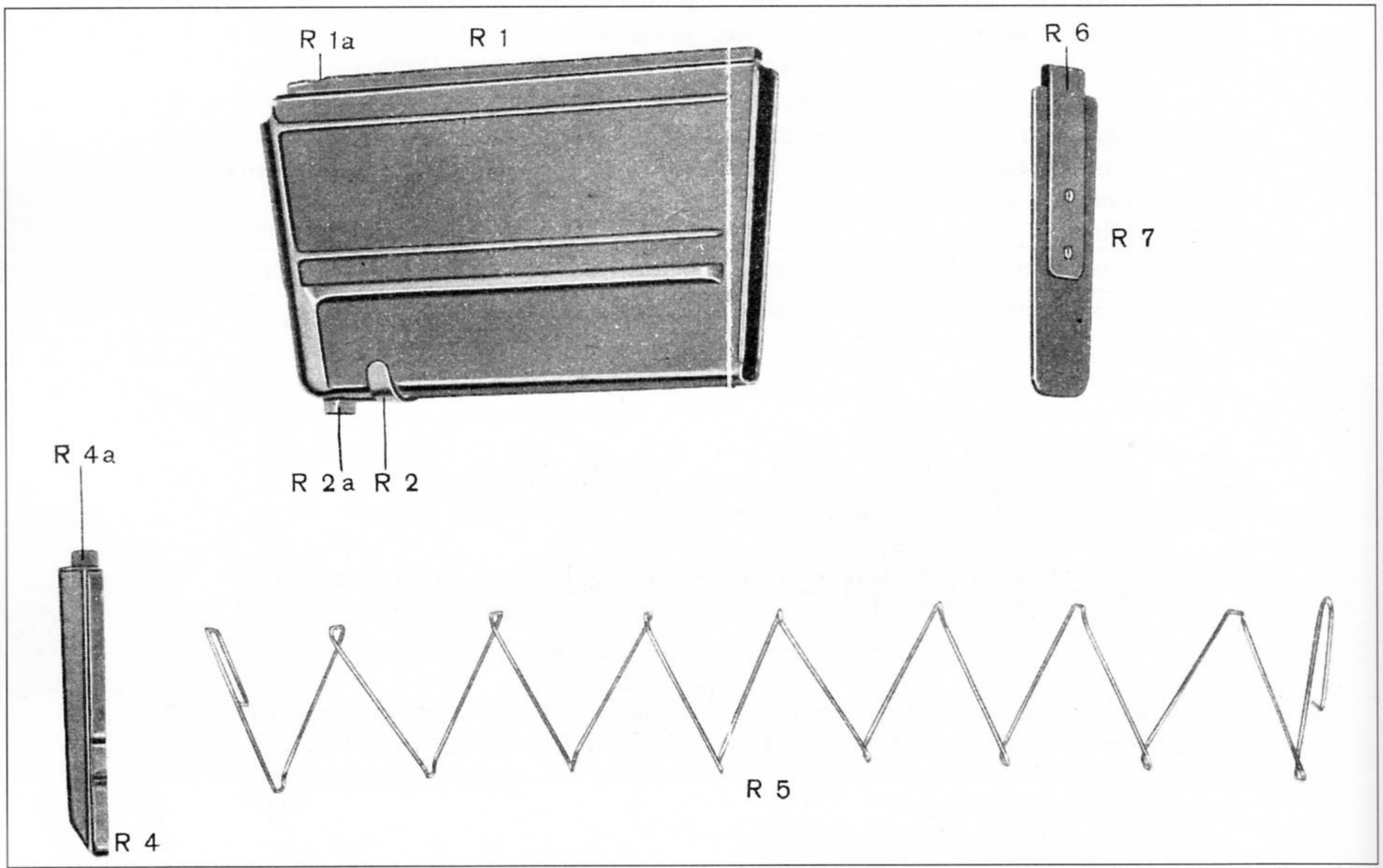
III. Description

The M10-42 and the M20-42 are the same except for length, so the magazine M20-42 only is described. The text applies as appropriate also for the M10-42.

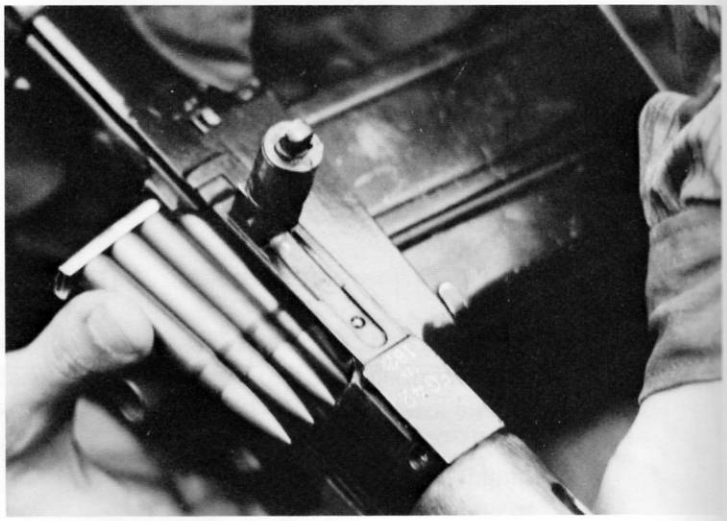
The magazine M20-42 consists of:

magazine housing	R1
magazine locking lug	R2
spring steel strip	R3
magazine follower	R4

follower spring	R5
floorplate	R6
floorplate disassembly spring	R7



47. Left: Fig 1 from Part 2 of the first edition of D. (Luft) T.6194, showing the components of the M20-42 magazine as used in the types 'D' and 'E' FG42.
Right: Illustrating the method of loading the magazine of the 'early' (types 'D and 'E') FG42 by means of standard 5-round charger clips, with the bolt cocked in the rearmost (automatic fire) position (note the cocking handle, visible under the operator's thumb).
Photo courtesy Brad Mann



The magazine housing (R1) is a flat hollow body whose lateral walls are rounded at the top end (feed lips) to support and guide the cartridges. The nose (R2a) of the locking lug (R2) engages a recess in the receiver, and the notch (R1a) receives the magazine catch (A3). To protect the magazine from the points of the loaded cartridges, a spring steel strip (R3) is rivetted to the forward inside surface. On the base of the magazine housing is the floorplate (R6), which supports the follower spring (R5), at whose top end is the magazine follower (R4) together with its nose (R4a). The magazine floorplate slides onto grooves in both sides of the magazine housing, and is retained by the disassembly spring (R7).

IV. Method of Operation

The magazine is loaded by hand [either singly, directly into the magazine, or by means of standard 5-round charger clips through the ejection port of the weapon with the magazine attached and the bolt held in the rearward, cocked position], whereby the follower (R4) is depressed by the cartridges and the follower spring (R5) is compressed. Because of the stepped surface of the follower the cartridges position themselves side by side in a zig-zag manner for optimum space utilisation. For firing, the nose of the magazine locking lug is snapped into the magazine well and the magazine is pressed to the rear until the magazine catch engages the rear notch. The follower spring positions the cartridges against the feed lips of the magazine ready for feeding. The bolt head (D1), impelled forward by the mainspring, strips the leading cartridge into the chamber of the barrel (A11). When the last cartridge is fed and the magazine is empty, the nose (R4a) of the follower contacts the bolt stop (A5) which rises and engages the recess (D10f) of the bolt slide assembly, and the bolt remains open.

V. Employment

For attachment to the weapon, the magazine is held in the left hand – the points of the cartridges forward – and inserted until the nose of the front locking lug snaps into the recess in the front of the magazine well, then pressed to the rear until the magazine catch engages.

To remove the magazine grasp it with the left hand, press the magazine catch forward with the left thumb, and remove the magazine with a slight forward rotary movement.

VI. Servicing

The magazine is to be kept clean. Foreign matter on the inside must be removed. Examine the magazine carefully to ensure that it is not dented, and the feed lips are not bent out of shape or rusty.

VII. Maintenance

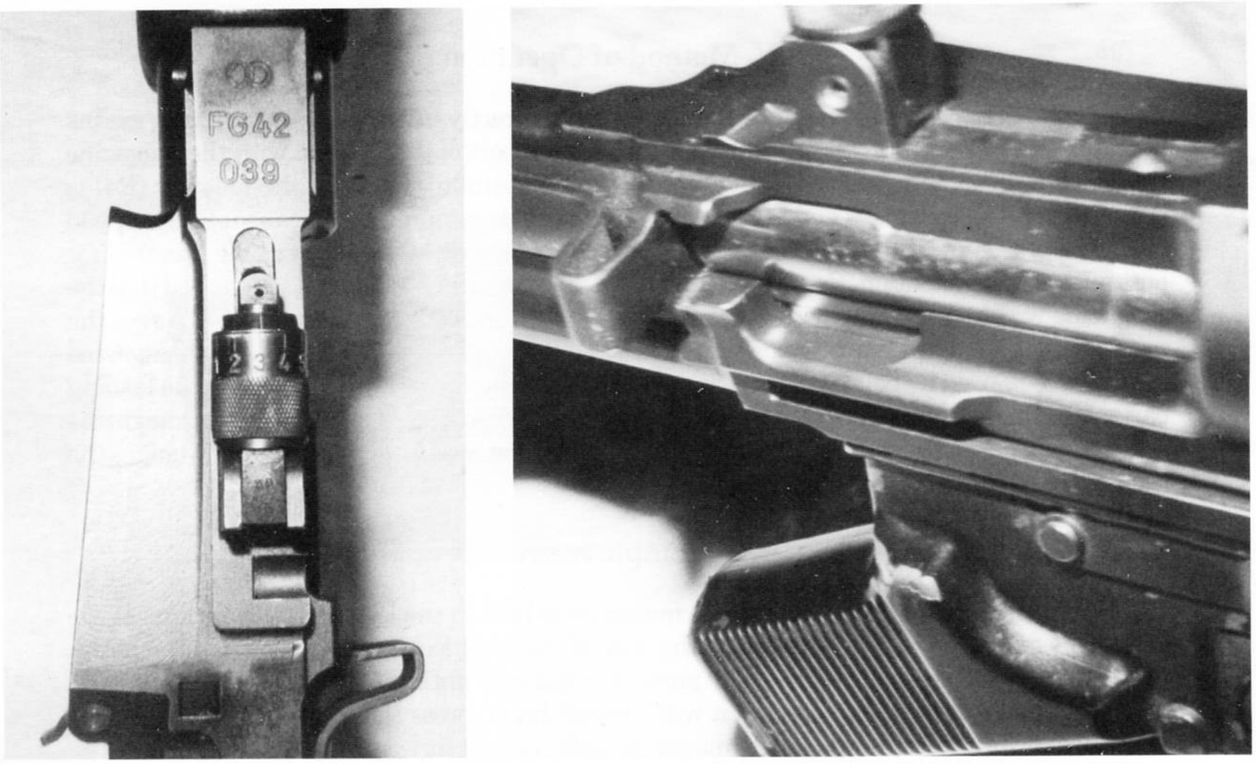
a. Disassembly and Assembly

1. Pull up the disassembly spring on the floorplate.
2. Slide the floorplate forward and remove.
3. Remove the follower spring and follower from the magazine housing.

b. Stoppages and their correction

Stoppages due to dirt in the magazine will be avoided by repeated cleaning, which will keep the magazine serviceable.

The firer is forbidden to attempt to correct bends, dents or other damage to the magazine.



48. Four views of an extremely rare and interesting prototype FG42 made by Rheinmetall, serial no 039, fitted with an experimental early version of the spent case deflector. This feature was dropped from the series-production type 'E', most likely for reasons of economy, only to resurface later in the stamped-receiver types 'F' and 'G'.

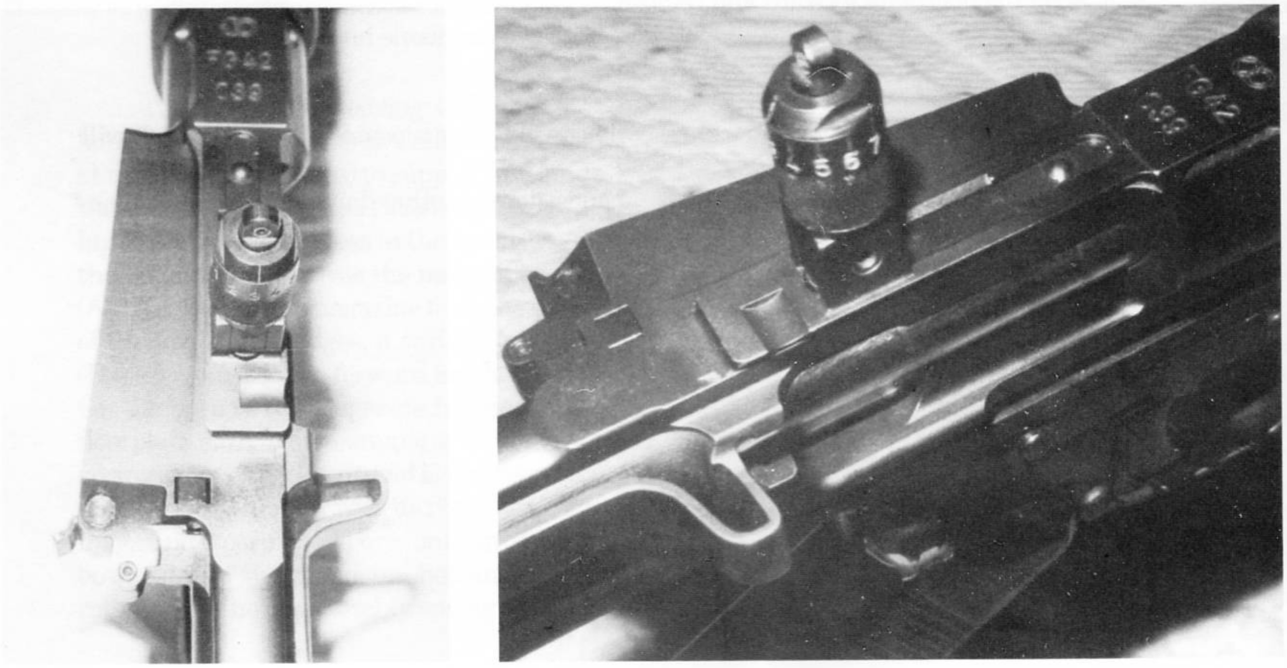
Above, left: closeup of the top front of the receiver, showing (from top) the Rheinmetall logo, the neatly pantographed designation 'FG42', and the serial number, '039'. This gun, presently in a private American collection, was brought back from the 101st Airborne drop zone in Normandy by an ex-Sergeant in the 508 PIR/82nd Airborne Division. Although now fitted with a standard type 'E' ribbed butt and a pistol grip with the late-type rolled triggerguard (and quite likely so issued), this gun probably began its existence as part of the Rheinmetall 50-gun type 'D' test series – perhaps as the next consecutive type 'D' to the no 038 which featured in the Tarnewitz endurance trials.

Above, right: front three-quarter right side view, showing details of the spent case deflector. Note the absence of the lower charger-loading guide.

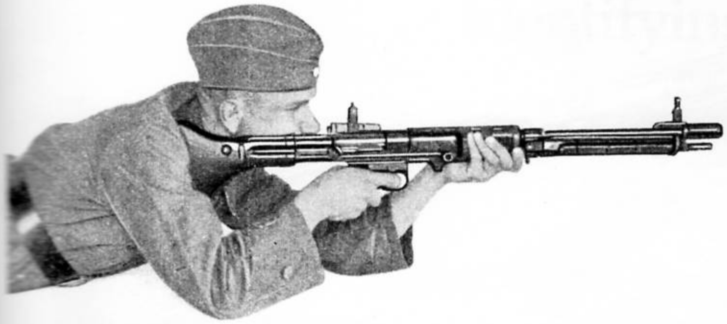
Below, left: closeup of the top rear of the receiver, showing the 'arm' of the spent case deflector. Note the crisp machining, denoting meticulous pre-series-production manufacture in the Rheinmetall toolroom.

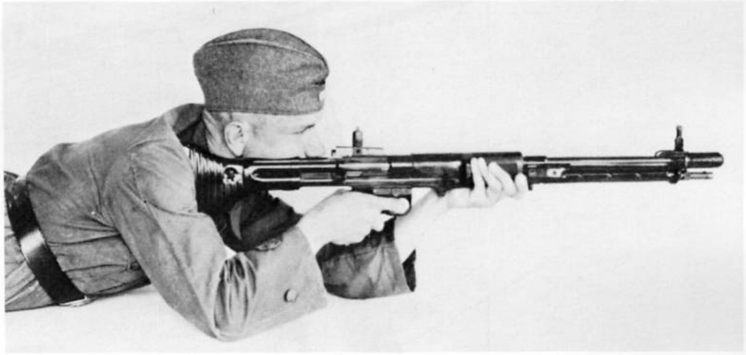
Below, right: rear three-quarter right side view, showing additional details of the spent case deflector.

Photos courtesy Richard C Long



Development by Rheinmetall; Production by Krieghoff





49. The transition:

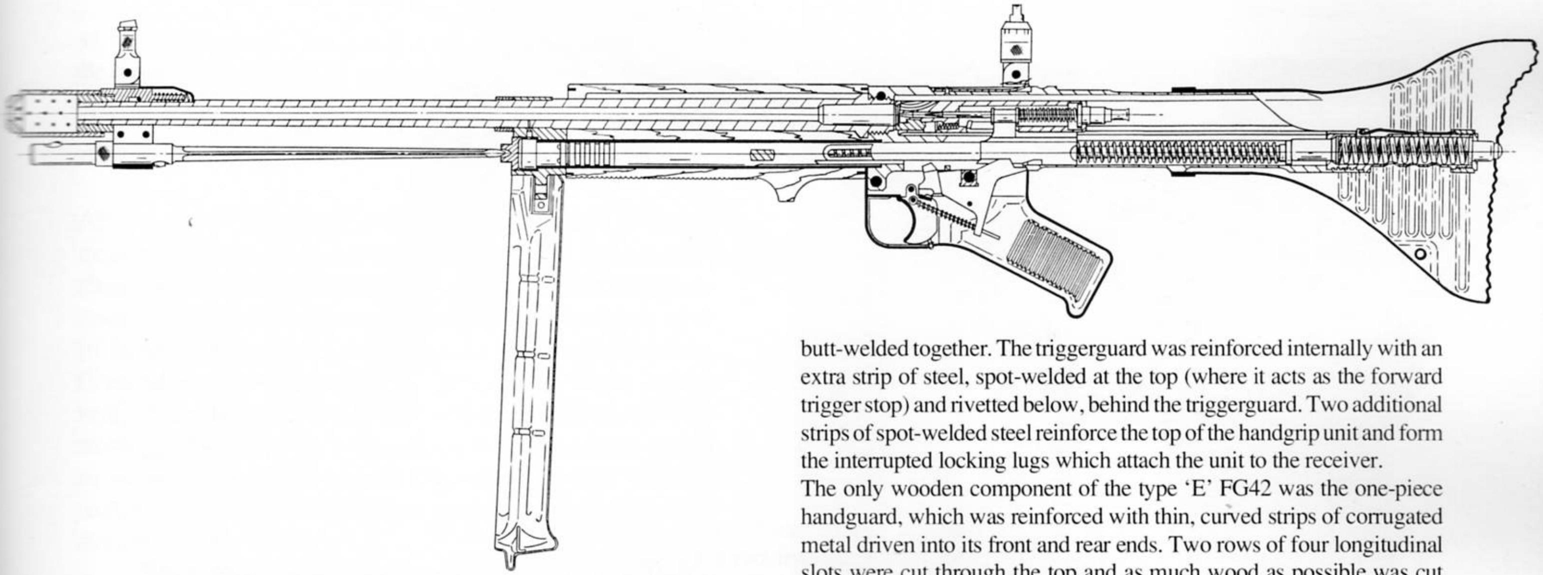
Left: Fig 30 from the first edition of D. (Luft) T.6194, showing the approved prone firing position with the 'early' FG42. Note the smooth buttstock and early triggerguard: the weapon pictured is a type 'D' FG42.

Courtesy James Alley

Right: the identical picture, reposed, using a type 'E' FG42 (note the corrugated buttstock). Photo courtesy George Petersen

Although the pre-production prototypes had been developed by Rheinmetall, once series manufacture of the type 'E' FG42 was approved Göring's financial interest in the affairs of Heinrich Krieghoff influenced the choice of contractor, and Krieghoff was duly awarded the first production contract for 5,000 guns.

The exigencies of the war soon proved this to be a wildly optimistic number. Krieghoff actually manufactured only about 2,000 guns during the tempestuous few months of the production lifespan of the 'early'



50. A cutaway drawing of the left side of the type 'E' FG42, showing the action at rest and the bipod legs down.

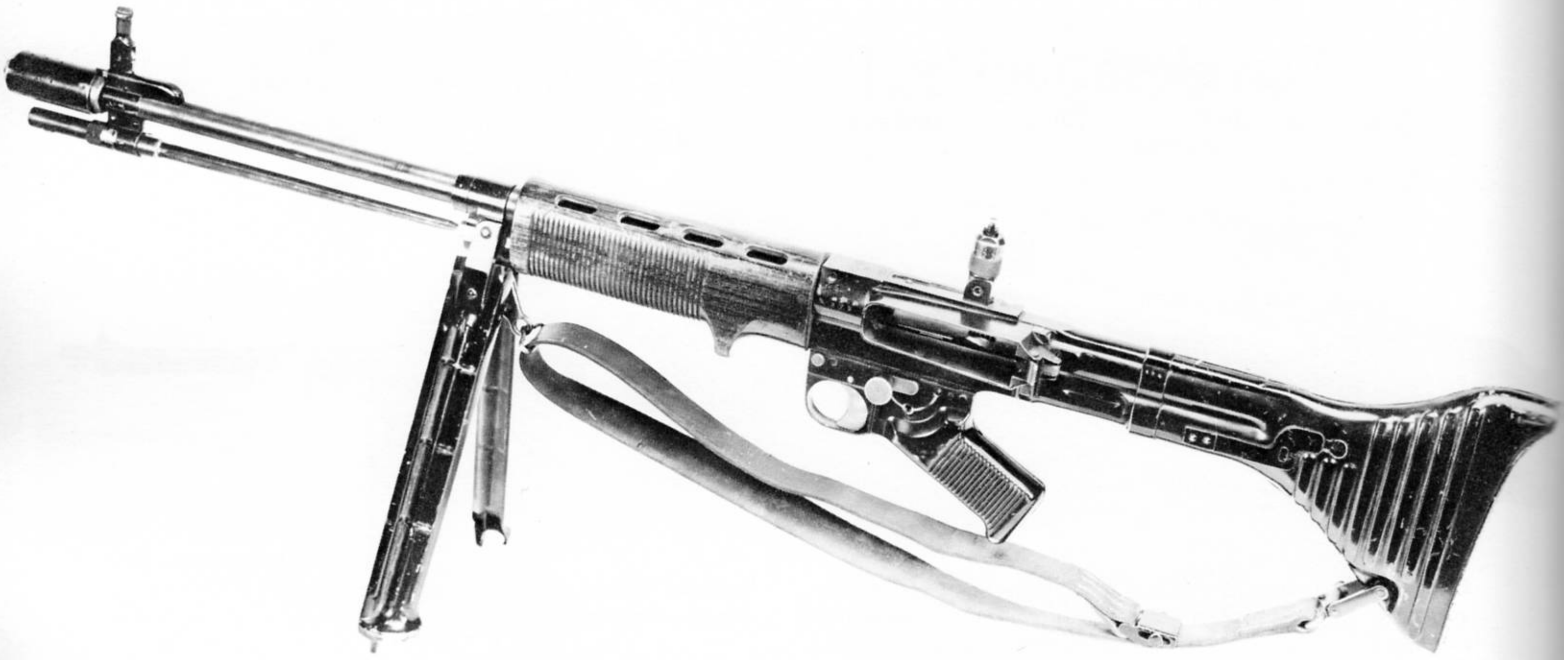
Both sides of the distinctively ribbed, pressed-steel buttstock were welded together along their top and bottom edges with a reinforcing band spot-welded around the forward end and a curved, corrugated "buttplate" welded in at the rear. A small-diameter metal tube, passed through holes in the hollow stock near the toe and crimped in place, served as the rear sling mounting.

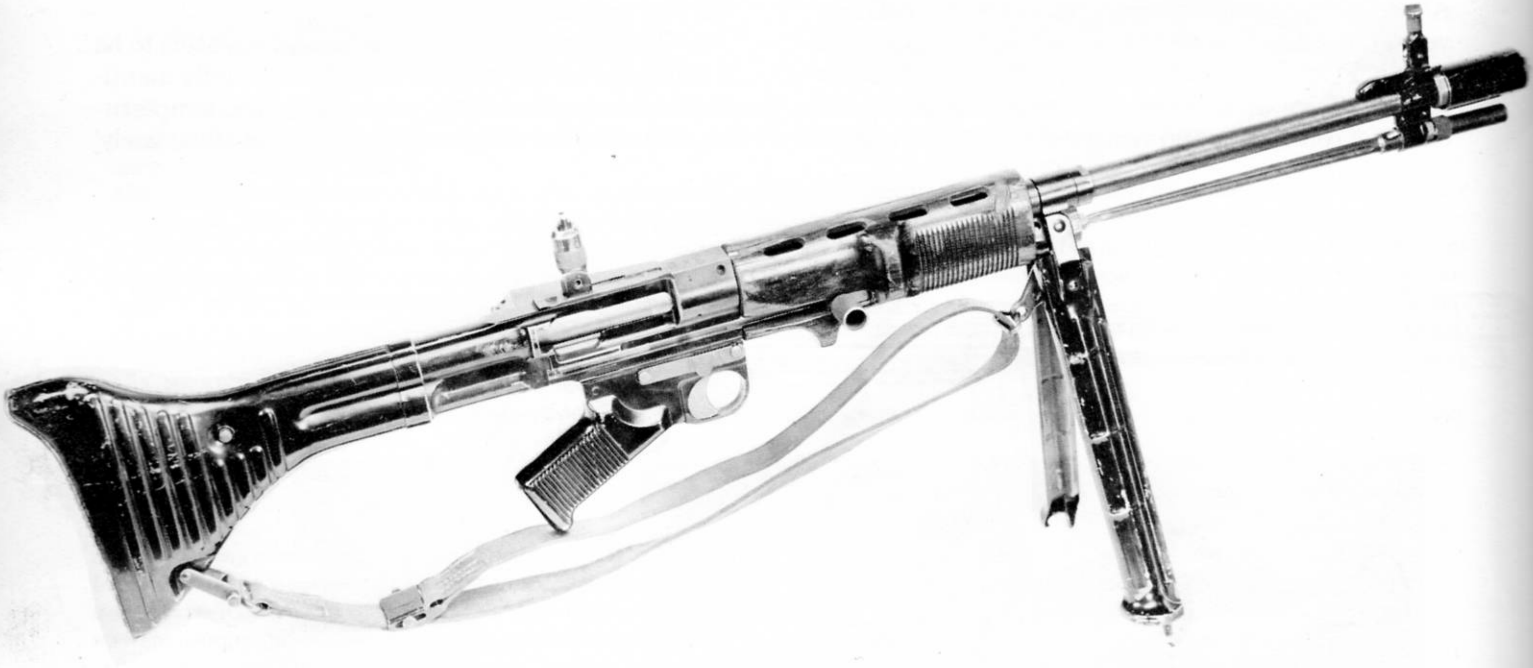
The integral handgrip/triggerguard was formed of two halves of light-gauge pressed steel, ribbed for extra strength in the pistol grip area and butt-welded together. The triggerguard was reinforced internally with an extra strip of steel, spot-welded at the top (where it acts as the forward trigger stop) and rivetted below, behind the triggerguard. Two additional strips of spot-welded steel reinforce the top of the handgrip unit and form the interrupted locking lugs which attach the unit to the receiver.

The only wooden component of the type 'E' FG42 was the one-piece handguard, which was reinforced with thin, curved strips of corrugated metal driven into its front and rear ends. Two rows of four longitudinal slots were cut through the top and as much wood as possible was cut away from the interior, to allow for maximum air circulation. Projections on the right and bottom insured correct placement of the firer's left hand, and the gripping surfaces were vertically grooved to prevent slippage.

The type 'E' muzzle brake had 32 small gas escape holes each about $\frac{1}{16}$" in diameter drilled into its circumference. It was bored out directly from the rear, then threaded and screwed onto the muzzle brake mounting sleeve, thus eliminating any complicated interior machining such as that found in the Cutts compensator used with the US model 1928 and 1928A1 Thompson submachine guns.

Aberdeen Proving Ground drawing, entitled "Paratrooper Rifle German Fallshrimgewehr [sic] – 42", dated Mar 18, 1944.



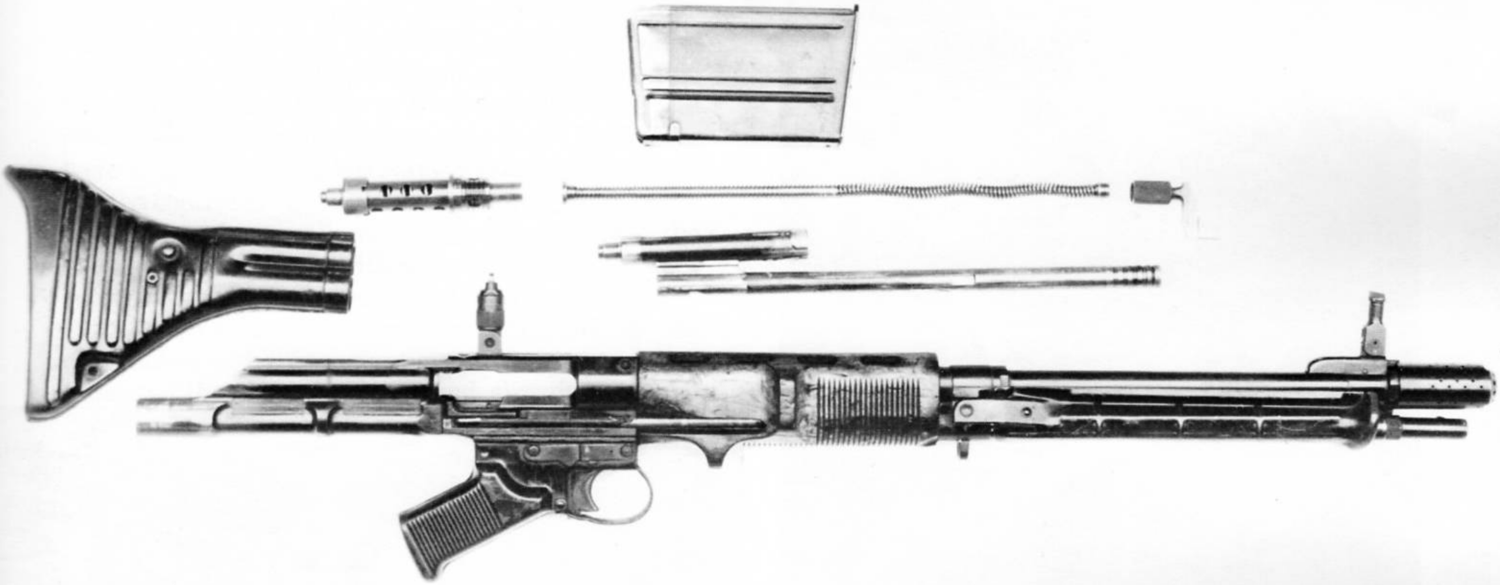


51. Left and right side views of the first series-production version of the FG42, the type 'E', with bipod open, bayonet stowed and sling attached.
Aberdeen Proving Ground photos dated May 15, 1944, courtesy James Alley

series (type 'E') FG42, all marked with the assigned Krieghoff code letters 'fzs'. Contrary to German weapons production practice in general, waffenamt (WaA) acceptance stamps do not appear on any FG42, as the normally ubiquitous *Abnahme* organisation was not at all involved in overseeing the production of this weapon. Instead the Luftamt acceptance mark – a stylised eagle – was stamped on the body and the butt.

Krieghoff had previously acquired the old Pieper plant in Liège (*Lüttich*) Belgium, and plans were apparently afoot to open a second source of production of the type 'E' at this facility, then known as "Plant no 10". Nothing more is known of this, although interestingly, for a time after the war the Belgians apparently contemplated a reintroduction of the FG42, which logically suggests that the tooling and/or manufacturing drawings were available to them.

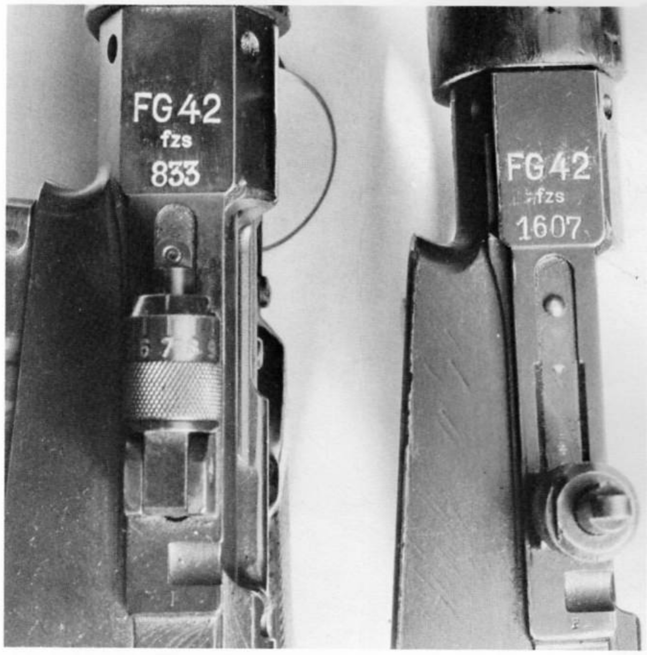
Identifying the Type 'E'



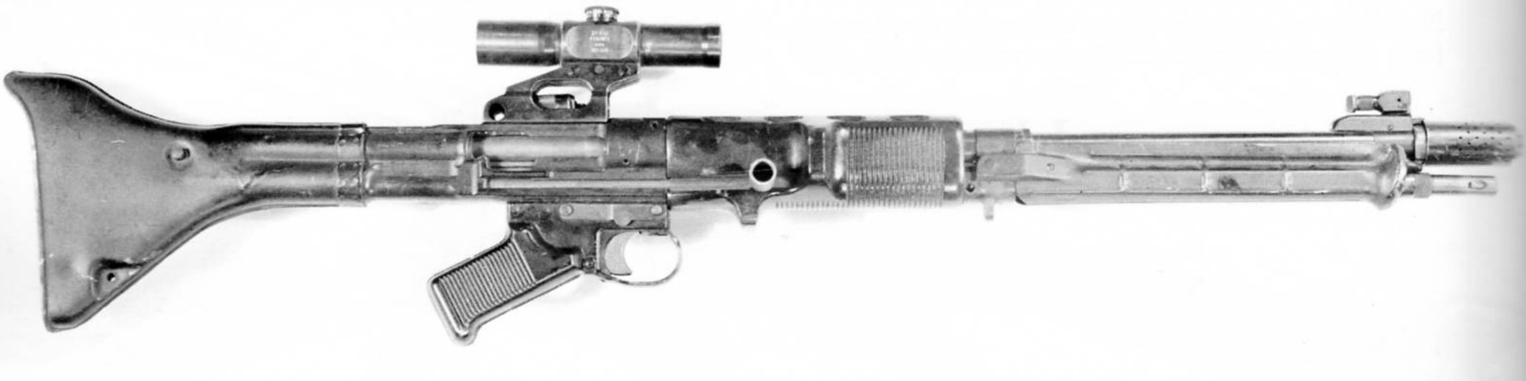
52. (Above) Right side view of a late-issue type 'E', field stripped. Note the larger rolled sheet-metal triggerguard, which provided a larger opening for use when wearing gloves.
Courtesy Ministry of Defence Pattern Room, Nottingham, photo by Thomas B Dugelby

After a close examination of the parts which had failed during the type 'D' endurance trials, it was determined that most of the problems were of a metallurgical nature and could be corrected either by an adjustment in heat treatment or a change in steel specification. (Indeed, a note appended to the type 'D' trials report had concluded that the projected quantities of replacement parts could be reduced once the recommended modifications were implemented). For this reason many of the the modifications embodied in the type 'E' are not visible externally.

Early examples of the type 'E' were fitted with the original type 'D' design of handgrip, with the trigger guard integrally formed as part of the two stamped halves of the slanted handgrip frame. The trials report had already singled out the rather skimpy trigger opening thus provided as being difficult to negotiate while wearing gloves, and in later production the integral trigger guard was replaced by a simple rolled sheet-metal loop, rivetted or spot-welded in place.

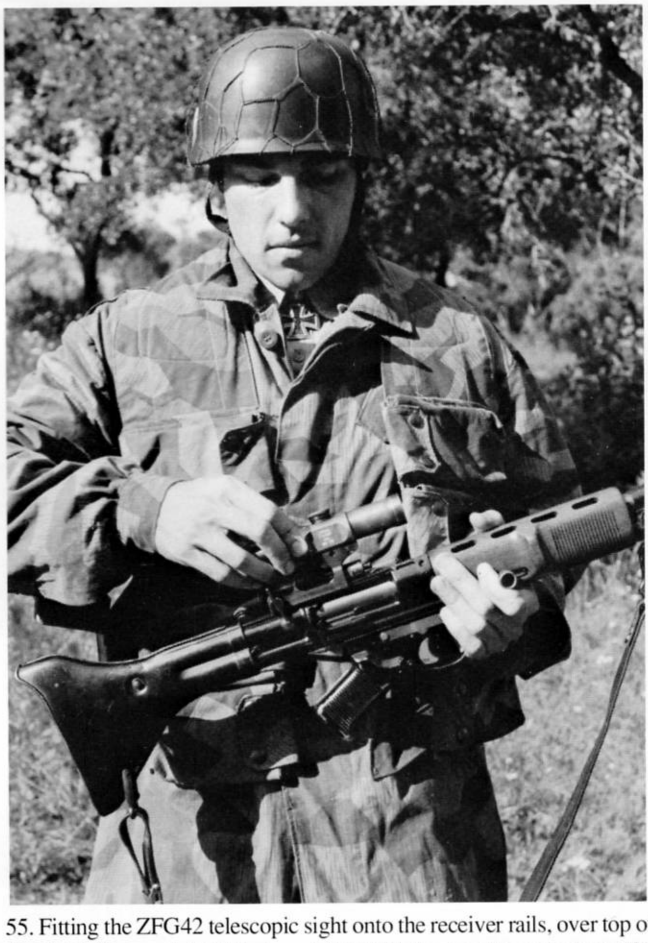


53. Top closeups of two type 'E' FG42 receivers, serial no 833 (left, with magazine installed and rear sight folded); and no 1607 (right, with no magazine and rear sight raised).
Courtesy Ministry of Defence Pattern Room, Nottingham, photo by Thomas B Dugelby



54. Right side view of a late-issue type 'E' fitted with the standard Voigtländer ZFG42 telescope sight. Interestingly, it appears that this weapon was issued fitted with both the early smooth buttstock and the late-style large, rivetted-on triggerguard.

Photo courtesy Dr Edward C Ezell



55. Fitting the ZFG42 telescopic sight onto the receiver rails, over top of the (folded) rear sight. This type 'E' FG42 also has the early (smooth) buttstock and the late (rolled) triggerguard.

Photo courtesy Brad Mann

56. Firing the type 'E' FG42 with the ZFG42 telescopic sight in place. Note the M10-42 (10-shot) magazine. Photo courtesy Brad Mann

Some production guns were issued fitted with the smooth aluminum buttstock of the type 'D', but for most of the type 'E' series the buttstock was made of thin pressed sheet steel, ribbed with vertically-stamped corrugations for strength.

Being a production model the fit and finish of the type 'E' was not as fine as that found on earlier prototypes, the butt welds being visible and the rest of the weapon blued and/or painted black.

The Short-Lived Conversion of the FG42 to 7.92x33mm *Kurz*

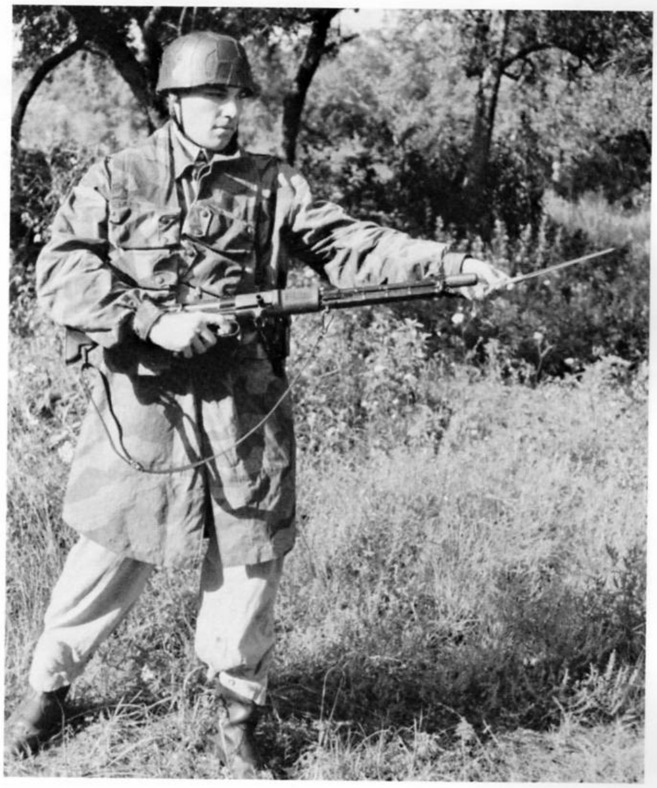
Theodore (Ted) Rakula, a noted German arms designer who worked in Switzerland for Oerlikon and the Rheinmetall subsidiary Solothurn before the war, was employed at the Rheinmetall plant in Sömmerda during the development of the FG42. He later went on to specialise in large-calibre aircraft machine guns and cannons as a team leader at Rheinmetall-Borsig, and after the war emigrated to America where his talents were employed by the US Navy and other Ordnance-related concerns.

It was his recollection that Louis Stange, the designer of the original Rheinmetall FG42, had personally wanted to develop the weapon in calibre 7.92x33mm *kurz* (short), but that when Göring was approached with this suggestion, the Reichsmarschall protested that Hitler himself had already seen and fired the FG42 in the 7.92x57mm calibre, and it was the Führer's wish that the weapon remain chambered for the standard full-power round.

A rather ironic replay of Stange's original preference for the more advantageous characteristics of the *kurz* cartridge took place soon after stocks of production FG42s became available for the first time in the fall of 1943. Working on their own, the Army Ordnance Department at Kummersdorf converted a few specimen type 'E's to fire the *kurz* round, in yet another attempt to win the paratroopers over to the advantages of the new intermediate-range assault rifle concept. This was stubbornly resisted, however, as the requirement for accurate, long-range fire remained high on the list of *Fallschirmjäger* priorities, and the standard 7.92x57mm round was again retained.

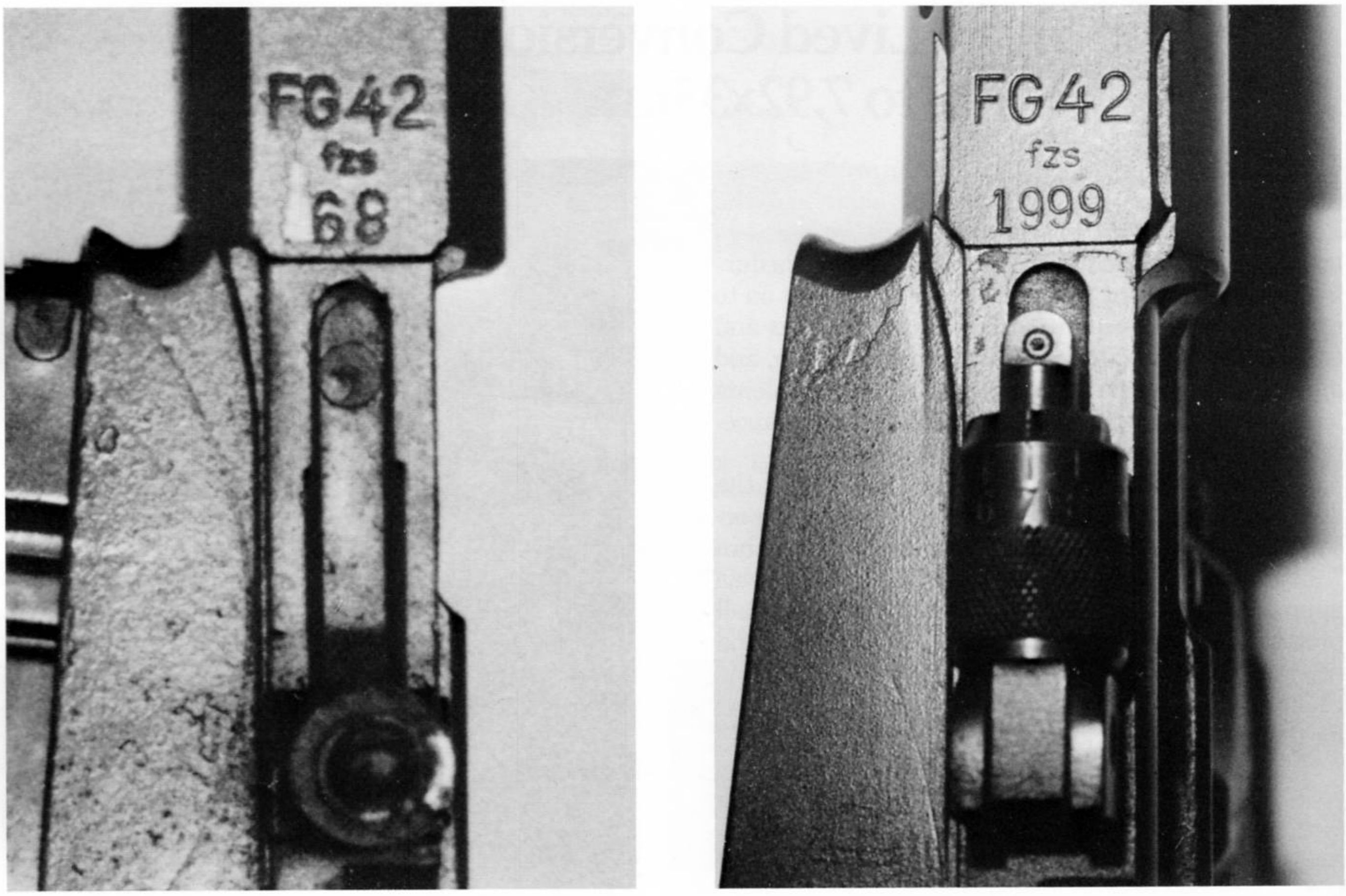
An interesting anecdote which corroborates the existence of at least one example of the ultra-rare *kurz*-calibre FG42 was related to the editor by John Breathed, the noted American author of the book *System Mauser*. Breathed served with the US Army in France during World War II and, after the collapse of Germany in 1945, was a first lieutenant stationed at the town of Bazencourt, near Reims, where large numbers of US soldiers were being gathered in camps for processing and transfer. US Army regulations stated that a soldier might send home one of each sort of item that he had 'liberated' — one rifle, one pistol, one set of binoculars, and so on. Anything over the 'one-of-each' limit was ordered dumped onto a pile before the soldiers were marched away out of their holding camps.

Lt Breathed was ordered to supervise a number of ex-*Wehrmacht* prisoners-of-war in the task of cleaning, greasing up, wrapping in waxed paper and crating the sizeable quantity of German small arms thus collected as 'overages' from the departing American soldiers, for rail transshipment to, of all places, Russia!



57. Affixing the bayonet to the type 'E' FG42.
Photo courtesy Brad Mann

One day he came upon an unusual automatic rifle with a left-side-mounted magazine, which looked as if it was made for a cartridge about two-thirds the length of the standard 7.92mm rifle round. Lt Breathed asked one of his 'tame' German technicians about it, and the man said that he knew what sort of ammunition it fired, and wrote this information down for him. Taking this piece of paper to a nearby US Army bomb disposal unit, where vast quantities of all sorts of small arms ammunition were stockpiled, Lt Breathed was given a few small boxes of 7.92 *kurz* cartridges. He loaded up the rifle and, aiming it at the wall of a nearby cliff, pulled the trigger. As it happened, the unfamiliar rifle was set for automatic fire and the burst, taking him by surprise, caused the muzzle to rise so that the last few rounds went over the top of the cliff. After the noise of



58. The early and the late.
Left: top receiver closeup of FG42 type 'E' serial no 68, the lowest-number type 'E' seen during the course of this study. Ross Williams collection
Right: top receiver closeup of FG42 type 'E' serial no 1999, the highest-number type 'E' seen during the course of this study.
Byron Vickery collection

the shooting had died away another of the German ex-soldiers, who had been engaged in ploughing the field atop the cliff, stuck his head over to announce that Breathed had bagged perhaps the last casualty of the European theatre — his French plough-horse!

Chapter Five

The War Forces a Redesign of the FG42

By the late fall of 1943, even though production of the type 'E' had only barely begun, chronic shortages of certain critical materials, forced on the Germans by the exigencies of war, made it necessary to activate previously-laid plans for a complete redesign of the FG42. The main problem concerned the intricately machined receiver, which was originally designed to be fabricated from a tough nickel-steel alloy. By mid-1943 Germany was experiencing great difficulty in importing nickel, and the FG42 receiver specification had been altered to permit the use of chrome-manganese steel. Other projects had a much more urgent priority than the FG42, however, and very soon sufficient supplies of even the substitute chrome-manganese steel became unobtainable.

The Type 'F' – The First Stamped-Receiver FG42

In September 1943 the *Oberkommando der Wehrmacht* issued a decree to the effect that the FG42, along with the MKb42, the MP43, the MG15 and MG17 were to be "eliminated for reasons of uniformity". In the case of the latter two weapons, both obsolete machine guns, the decree was obviously meant to be taken in its most literal sense, but as for the others it signified changes of a different sort. The MKb42 had been superseded by the MP43, henceforth to be known as the 'MP44', so the only thing being "eliminated" here was some obsolete nomenclature. As for the FG42, the decree marked the decision to abandon the 'early' machined-receiver (type 'E') design in favour of the planned conversion to pressed carbon steel.

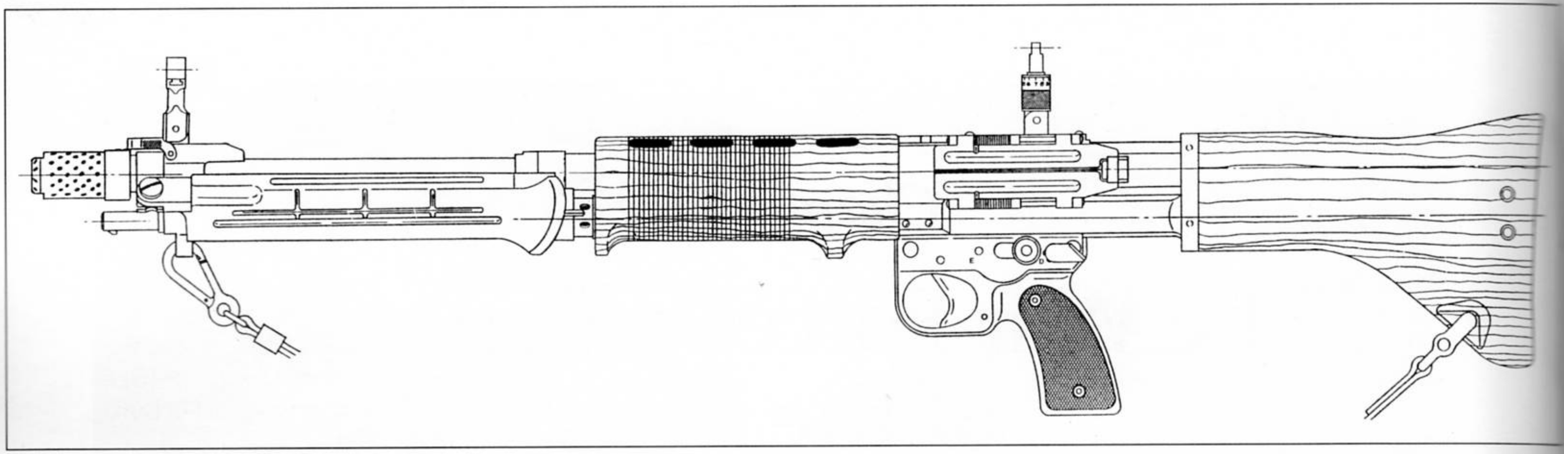
Thus the FG42 fell heir to the ingenious and efficient manufacturing techniques which had been pioneered in the production of the MG42 machine gun, where state-of-the-art sheet-metal pressings, together with other parts quickly swaged or forged with a minimum of finish-machining, were for the most part permanently assembled by pressure-fitting, spot-welding or riveting.

The first result of embracing this new technology in the FG42 programme was the type 'F', which embodied a complete redesign of the major external components of the weapon. Along with the new stamped receiver came a newly designed buttstock, which replaced the welded pressed-steel halves of the earlier pattern with an assembly fabricated from thin, pressure-glued laminations of beechwood. (This material itself represented a successful triumph over yet another wartime shortage, that of seasoned walnut, and was used in the stocks of millions of bolt-action K98ks and other German small arms).

The type 'F' was the prototype to the final production version the type 'G', and therefore existed in very small numbers. The type 'F' was the first FG42 to do away with the distinctive, swept-back pressed-metal handgrip, replacing it with a more conventionally shaped, two-piece chequered plastic pistol grip rivetted onto the tang of a strengthened pressed-metal trigger housing.

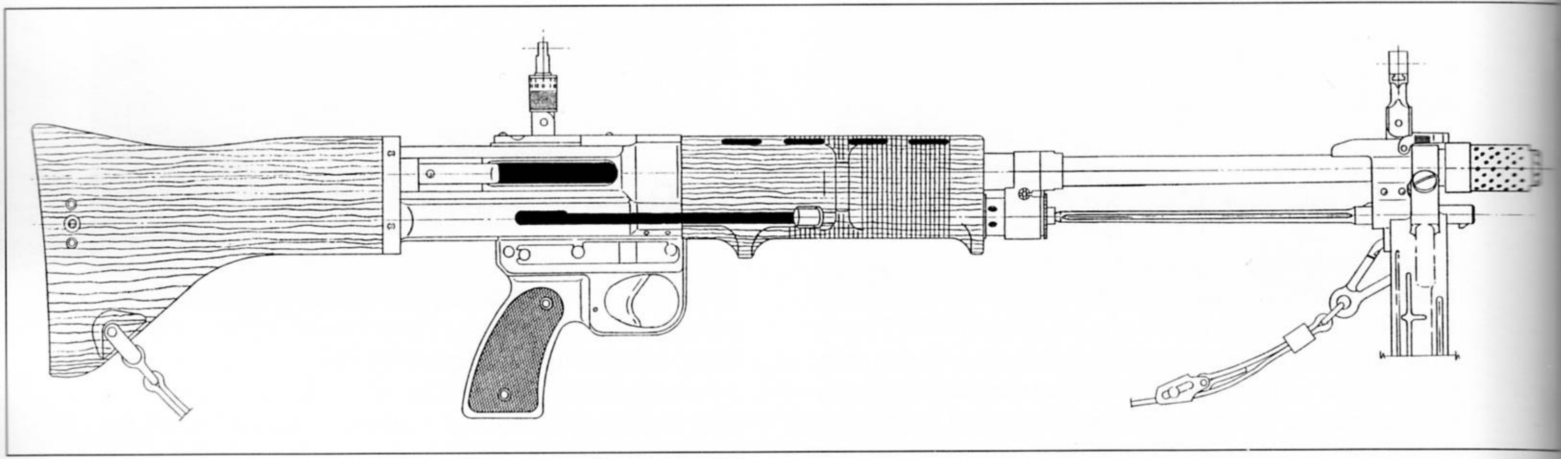
During the changeover the opportunity was taken to eliminate a number of noted shortcomings of the 'early' (type 'E') production model. In particular, as noted in the Tarnewitz acceptance trial report, the mainspring, extractor spring and firing pin spring were henceforth all made of double-wound or compound wire, which greatly improved reliability, resilience and recovery time.

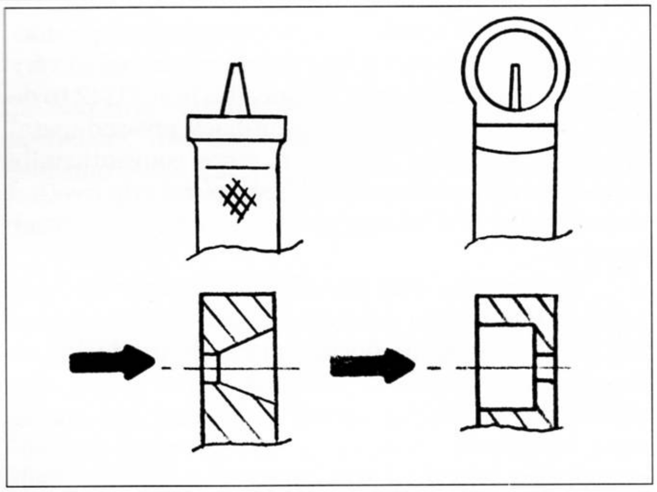
Perhaps because production continued at the firm of Heinrich Krieghoff/Suhl, it has often been reported that Kreighoff was responsible for the redesign programme which led to the type 'F' and beyond.



59 (Above). Left side view of the type 'F', the first stamped-receiver FG42, shown with bipod legs folded. Note (from front): the redesigned flash hider; the relocated front sling attachment point; the redesigned pressed-metal handgrip unit and rivetted-on plastic pistol grip; the separate fire selector and safety controls; the spring-loaded magazine well covers (shown closed); and the laminated wood buttstock.
Drawing by Thomas B Dugelby

60 (Below). Right side view of the type 'F', the first stamped-receiver FG42, shown with bipod legs open. Note (from rear): the relocated buttstock dismounting catch; the absence of charger-loading guides (obviated by the rivetted-on fired case deflector); the redesigned, hook-type cocking handle; and the relocated (front) bipod mount.
Drawing by Thomas B Dugelby





61. Two types of FG42 front and rear sights.
Left: the cone-type front sight (top) and rear peep aperture as used on the type 'E'. During the Tarnewitz endurance trials (reprinted in chapter 3) this design of rear sight was found to produce a distorted image when viewed with direct sunlight falling from behind the shooter, or when sighting against a dark background.
Right: the redesigned hooded front post sight and rear aperture first adopted in the type 'F' and also used in the type 'G'.
Drawings by Thomas B Dugelby

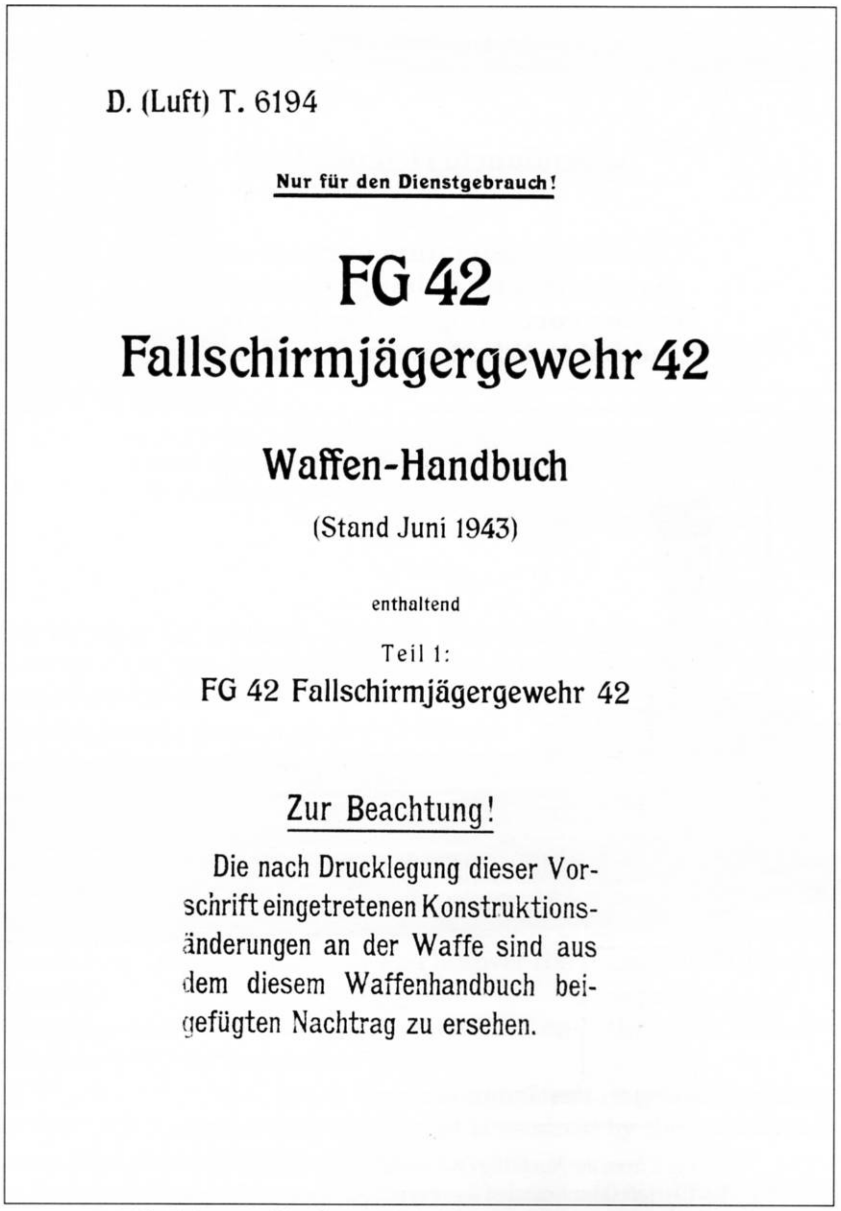
To date, however, all the original drawings and prints of redesigned components which the authors have examined bear the insignia of Rheinmetall-Borsig, substantiating that the redesign was in fact conducted there.

There is strong evidence, or should one say a strong 'family resemblance' to indicate that Dr Grunow of the firm of Grossfuss was consulted at some length concerning the midstream redesign of the FG42. As Germany's leading specialist in pressed sheet-metal, Dr Grunow had been responsible for the design of the pressings used in the MG42, among other work. Certainly, even today, one is struck by the innovation and high precision of the pressings used in the late-model FG42.

The December, 1943 *Nachtrag* (Addendum) to D. (Luft) T.6194

Although the Luftwaffe continued to ignore model or type designations, the introduction of the numerous major modifications embodied in the stamped-receiver FG42 prompted the *Reichsminister der Luftfahrt* to issue a *Nachtrag* or Addendum to D. (Luft) T.6194.

Just as the original July, 1943 manual had been issued to support the type 'E' but illustrated with pictures of the type 'D', the Luftwaffe did not wait for the appearance of the type 'G' but rushed the Addendum into print as soon as possible using pictures of the type 'F'. The following is a translation of the text of the Addendum, which first appeared in December, 1943 as a bound-in amendment to every issued copy of D. (Luft) T.6194:



D. (Luft) T. 6194

Nur für den Dienstgebrauch!

FG 42
Fallschirmjägergewehr 42

Waffen-Handbuch
(Stand Juni 1943)

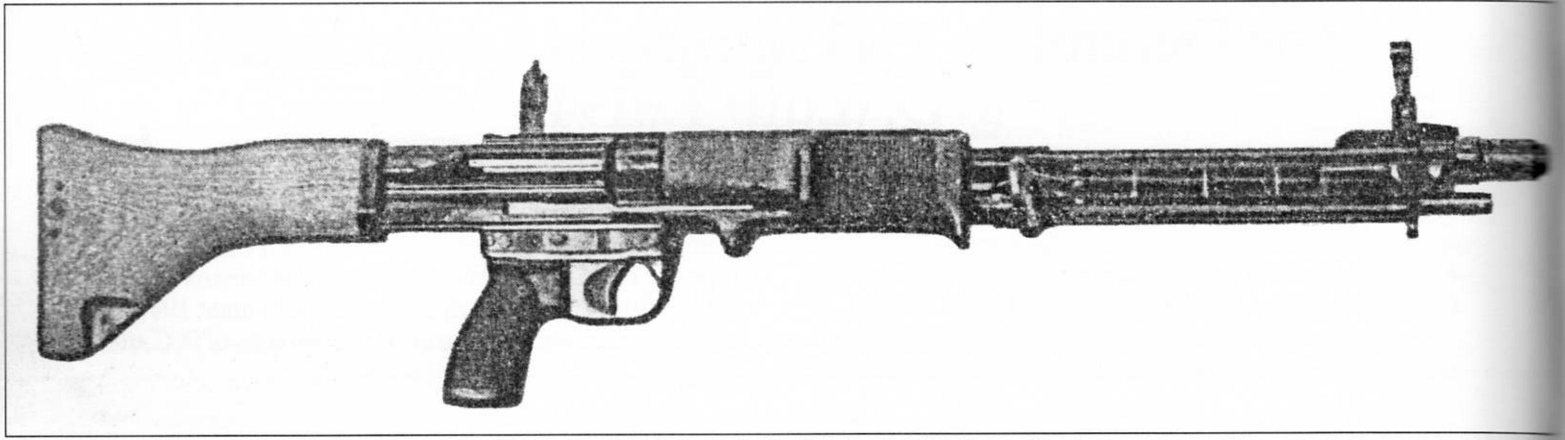
enthaltend

Teil 1:
FG 42 Fallschirmjägergewehr 42

Zur Beachtung!

Die nach Drucklegung dieser Vorschrift eingetretenen Konstruktionsänderungen an der Waffe sind aus dem diesem Waffenhandbuch beigefügten Nachtrag zu ersehen.

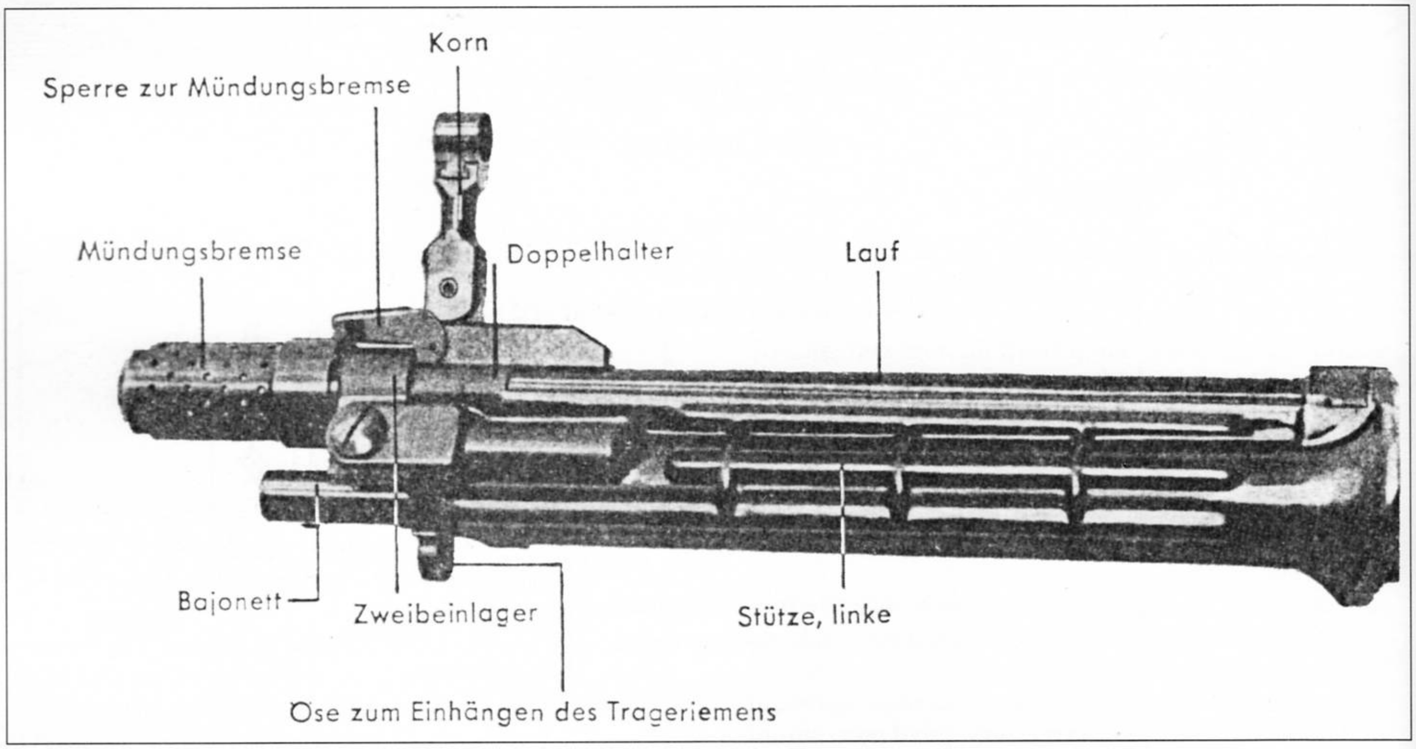
62. Title page of the first edition of D. (Luft) T.6194, with the *Nachtrag* (Addendum) notice tipped onto the bottom of the page. Compare with fig 22: this added notice (translated in the text) was the only indication that the manual had been expanded to include the Addendum pages of text and photos. Courtesy *Bundesarchiv*, Koblenz



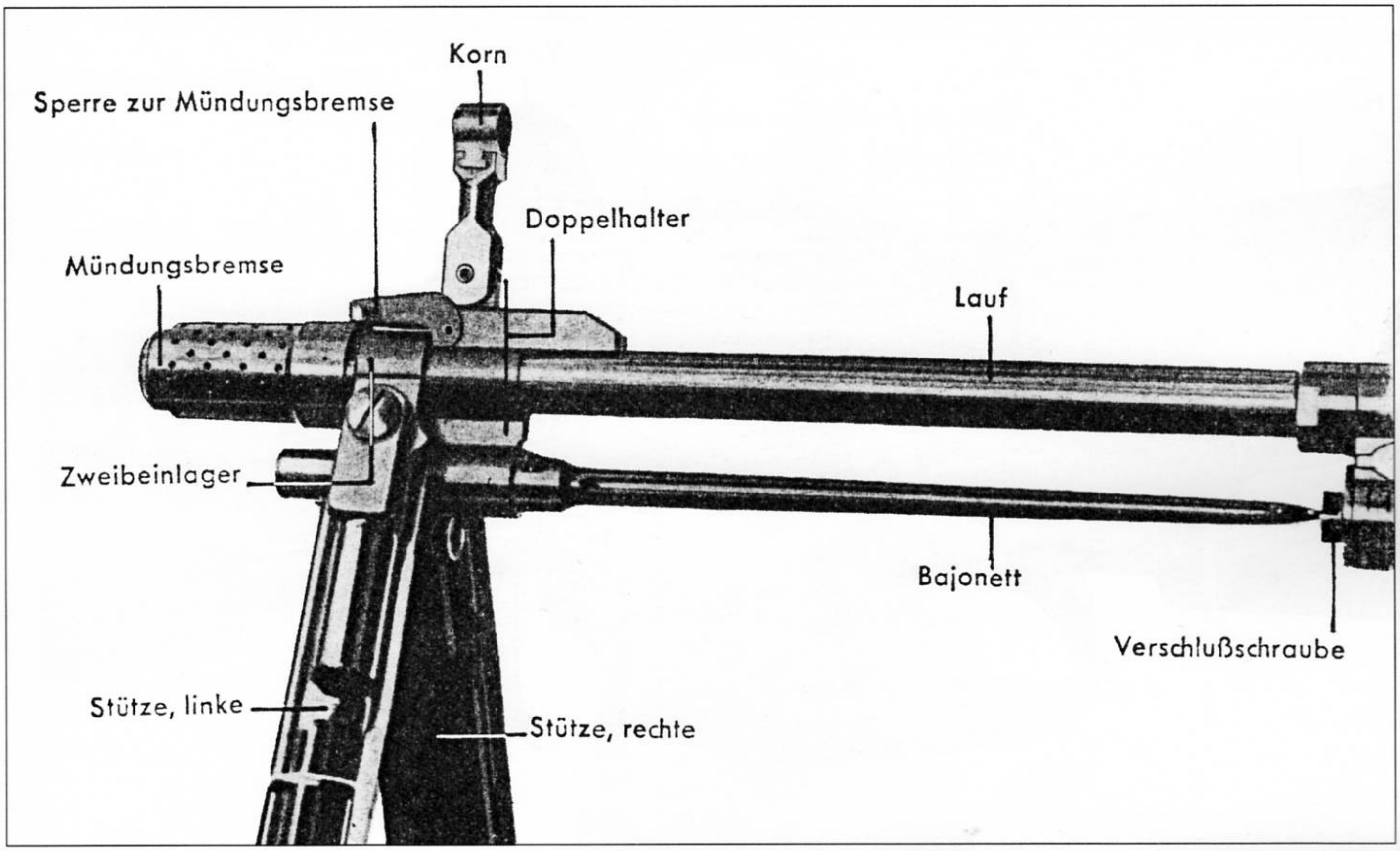
63. Fig 1 from the *Nachtrag* (Addendum) to the first edition of D. (Luft) T.6194: the type 'F' FG42, right side view.
Courtesy *Bundesarchiv, Koblenz*

Addendum to D. (Luft) T.6194

Notice!
Check the addendum very carefully
as construction changes essential
for the correct operation have been
added to this Weapon Handbook.



64. Fig 2 from the *Nachtrag* (Addendum) to the first edition of D. (Luft) T.6194: left side closeup of the forward barrel area of the type 'F' FG42 with bipod legs folded, showing the redesigned muzzle brake, muzzle brake catch, front sight, and bipod mount.
Courtesy *Bundesarchiv*, Koblenz



65. Fig 3 from the *Nachtrag* (Addendum) to the first editon of D. (Luft) T.6194: left side closeup of the forward barrel area of the type 'F' FG42 with bipod legs open and bayonet stowed.
Courtesy *Bundesarchiv*, Koblenz

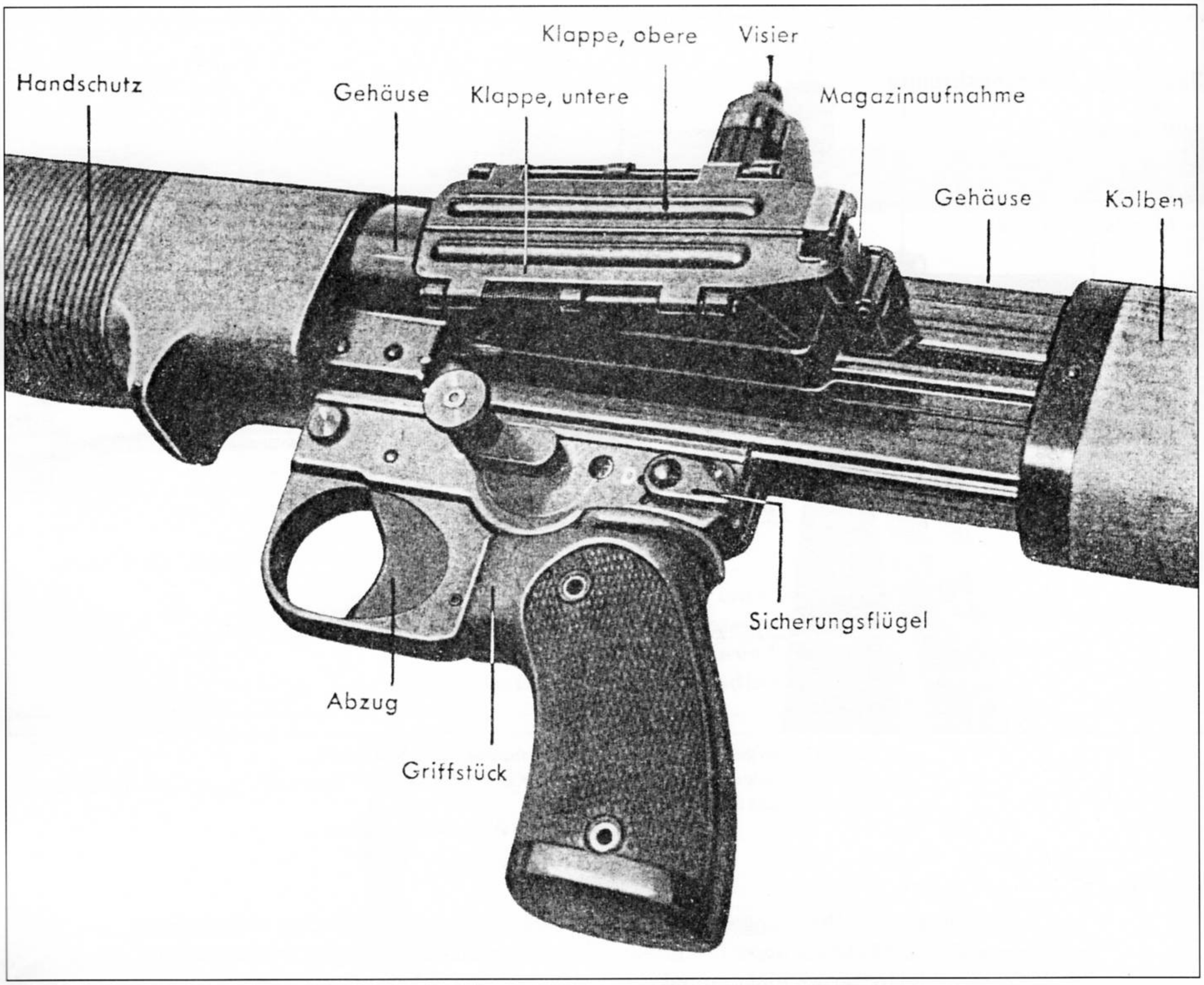
Note:

In this addendum the changes effected to the weapon during the printing of the operating manual for the FG42 are described briefly. The..part numbers of the components refer [as far as possible] to the original manual.

The modifications to the weapon are as follows:

A. Receiver assembly

1. The magazine catch (A3) has been strengthened and made larger.
2. Spring-loaded protective covers have been added to the top and bottom of the magazine well. These are held shut by the magazine catch which, when depressed, frees the covers to open automatically and uncover the magazine well for insertion of the magazine.
3. A cartridge case deflector has been rivetted onto the right side of the receiver, immediately behind the ejection port.
4. The bipod mount (A13), now a separate component, has been positioned forward of the front sight/bayonet block (A15), and is retained by the muzzle brake mounting sleeve (A14). The bipod legs now open forward.
5. The front sight has been modified to a bead shape with an 'O'-shaped sight protector.
6. The muzzle brake catch (A16), formerly located in the front sight block by means of a spring (A17), is now configured as a lever under spring pressure which engages a

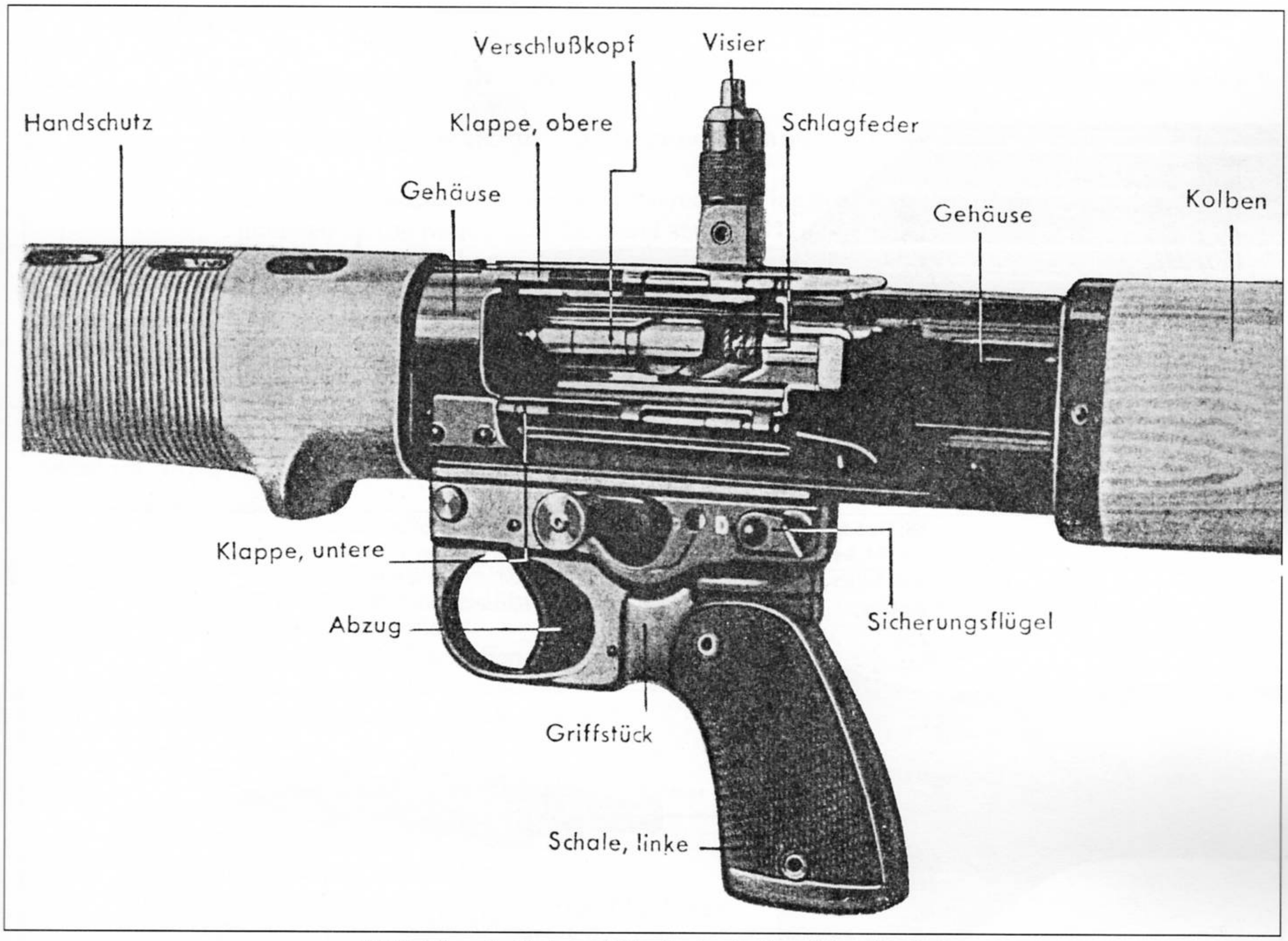


66. Fig 4 from the *Nachtrag* (Addendum) to the first edition of D. (Luft) T.6194: left side closeup of the receiver area of the type 'F' FG42 with magazine well covers closed, showing the redesigned handgrip assembly, the separate fire selector and safety controls, and the strengthened magazine catch. Courtesy *Bundesarchiv*, Koblenz

securing recess in the muzzle brake (A37).

7. The front sling attachment ring, previously located on the bipod mount, is now positioned on the front sight block.
8. A gas regulator (A40) has been added to the new gas block (A7), which is held onto the barrel by the lock nut (A12). Four different gas settings are indicated by indentations on the face of the regulator, and a double slot is provided for turning the regulator with a screwdriver. In order to prevent the regulator from turning independently a U-shaped lock spring (A41) is fitted around the gas block.

Note: before adjusting the gas regulator and/or removing the lock spring, the bayonet must be removed and the gas cylinder plug loosened.



67. Fig 5 from the *Nachtrag* (Addendum) to the first edition of D. (Luft) T.6194: left side closeup of the receiver area of the type 'F' FG42 with magazine well covers open and selector lever set on 'E' for single fire. Note the compound-wound firing pin spring, visible through the open magazine well. Courtesy *Bundesarchiv*, Koblenz

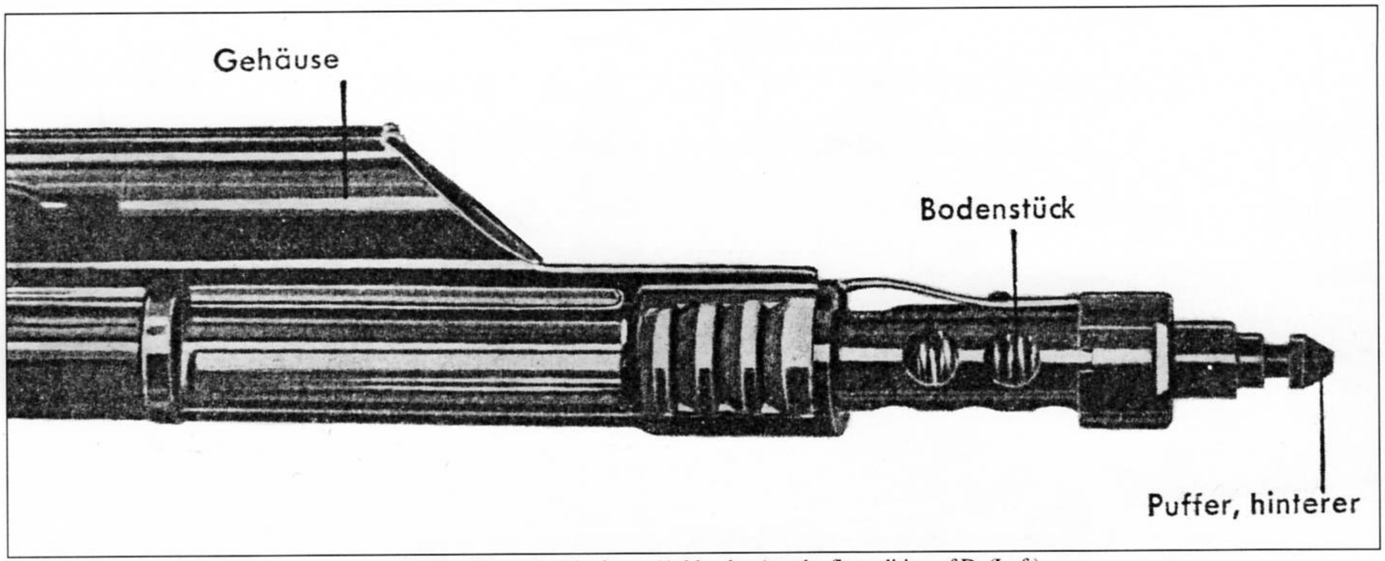
B. Handgrip Assembly

1. The selector lever (B13) is now a separate component, used only for setting single or automatic fire!

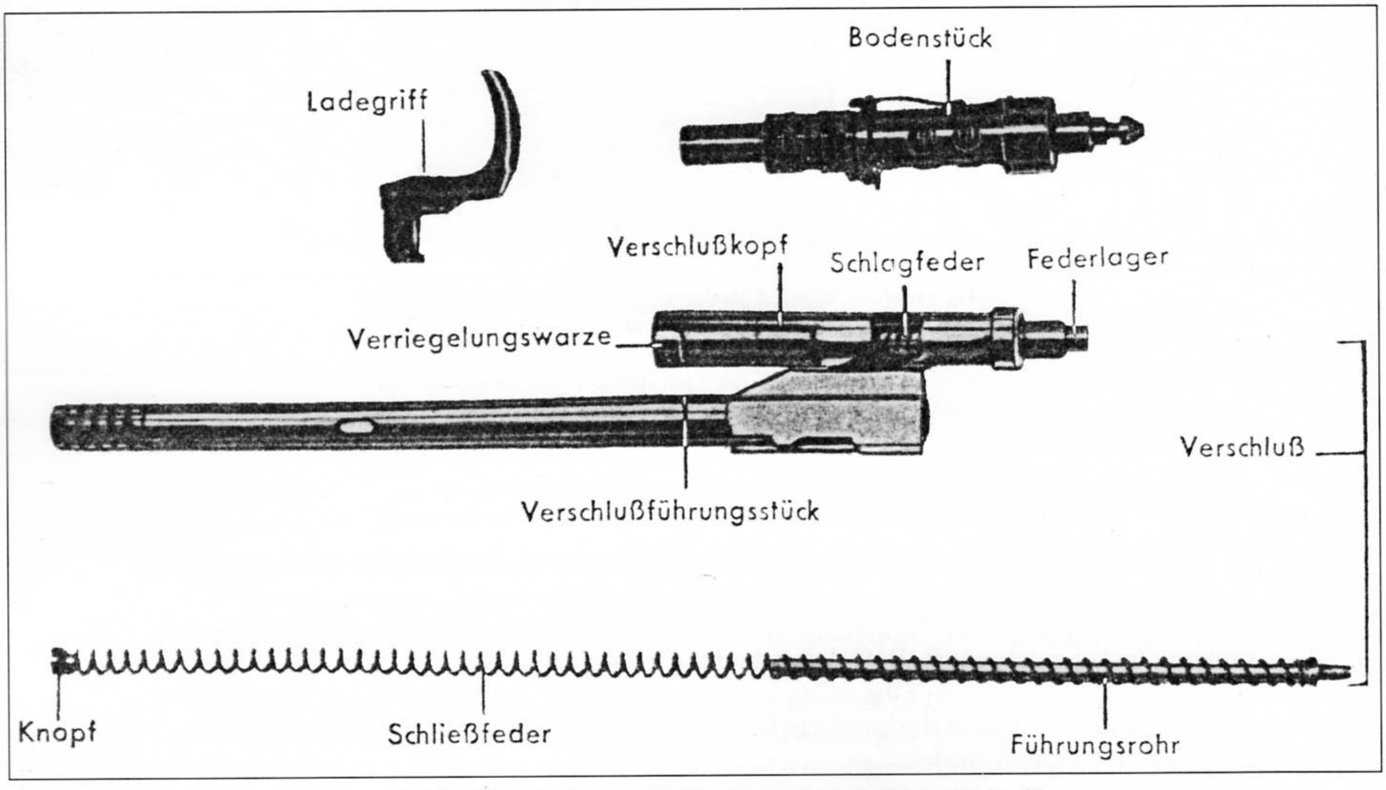
Note: the weapon can be put on safe only when it is cocked. This is now effected by pressing up the safety catch (B18), located on the left side of the handgrip frame behind the selector lever. The position of the safety lever is indicated by the letters ('S' = safety and 'F' = fire) on the rear surface of the handgrip frame. Two grip plates are rivetted onto the handgrip frame on the new model.

C. Buffer Assembly

1. The rear buffer bushing (C3) is now conical, and is supported by an abutment in the buttstock.
2. The buffer spring is now configured as two superimposed springs.



68. Fig 6 from the *Nachtrag* (Addendum) to the first edition of D. (Luft) T.6194: left side closeup of the rear receiver area of the type 'F' FG42 with buffer assembly in place. Note the redesigned, conical rear buffer bushing. Courtesy *Bundesarchiv*, Koblenz



69. Fig 7 from the *Nachtrag* (Addendum) to the first edition of D. (Luft) T.6194: the bolt and buffer assemblies of the type 'F' FG42. Note the redesigned (hook-type) cocking handle and the simplified recoil spring assembly. Courtesy *Bundesarchiv*, Koblenz

D. Bolt assembly

1. The cocking handle (D16), formerly a cylindrical knob, is now a curved, hook-shaped component.
2. The firing pin spring and mainspring are now both made of double-wound (compound) wire.
3. The recoil spring bushing, formerly the recoil spring guide bushing (D15), is now mounted on the front end of the recoil spring (D11), because the front recoil spring guide (old D13) and the recoil spring assembly lock pin (old D14) have been eliminated.
4. The rear of the gas piston/bolt slide assembly has been strengthened and changed from a round to a square cross-section.
5. The curved actuating cam slot in the bolt is closed at its rear end and no longer runs the full length of the bolt [thereby limiting the (previously solid) compression of the firing pin spring during recoil and hence greatly reducing the chronic fatigue failure experienced with the type 'E' firing pin spring].

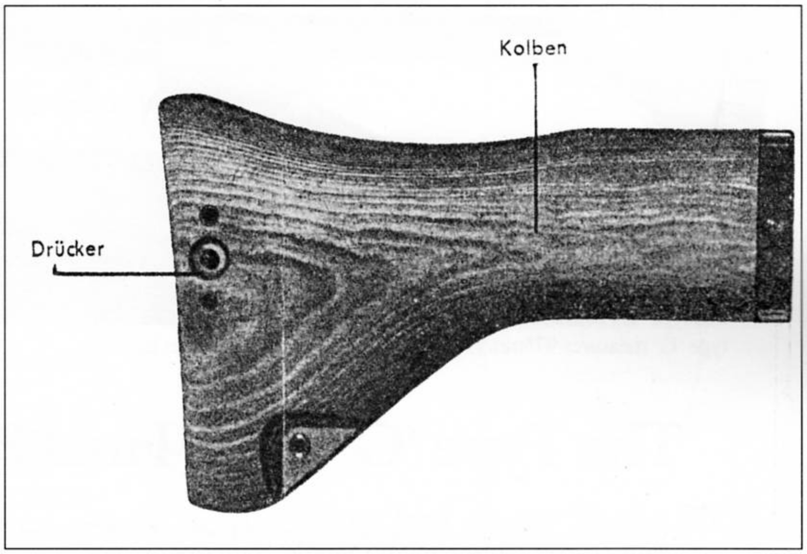
E. Butt assembly

1. The buttstock retaining catch (E4) on the new model is located at the rear of the right side of the buttstock.

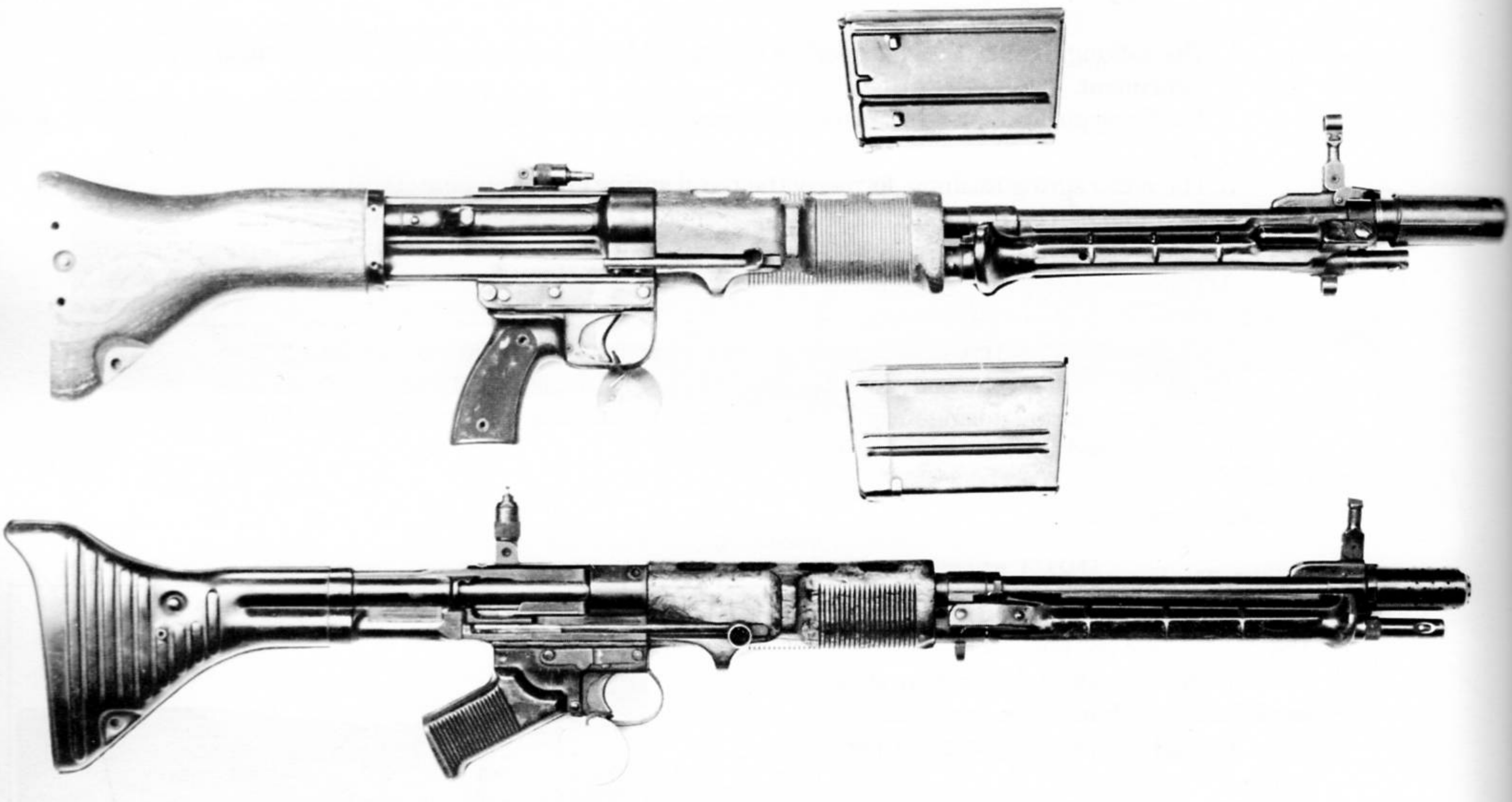
In the preceding description of the modifications, changes in material have been ignored because they are not pertinent.

The instructions in the operating manual apply for assembly and disassembly of the weapon in principle. However, the following should be noted in regard to disassembly and assembly of the bolt:

With the bolt assembly removed from the receiver guide, the firing pin spring bearing is removed as before by turning. The firing pin spring is removed and then the bolt head with the firing pin is lifted upwards from its engagement with the yoke of the gas piston. The bolt head is then tipped up to allow the firing pin to slide out. In assembly, the firing pin is slid well into its recess in the bolt head and then the yoke on the gas piston is inserted in the bolt cam slot with the firing pin resting on the tab of the yoke. Then the firing pin spring, etc, are inserted as before.



70. Fig 8 from the *Nachtrag* (Addendum) to the first edition of D. (Luft) T.6194: right side view of the redesigned, laminated-wood buttstock of the type 'F' FG42, showing the relocated retaining catch.
Courtesy *Bundesarchiv*, Koblenz



71. A comparison photo of the two production models of the FG42, showing right side views of a typical type 'G', above, and a representative type 'E', below, both with their respective M20-42 magazines. The type 'G' measures 975mm (38.2") overall, 30mm (1.2") longer than the type 'E'. Note the rubber muzzle cover on the type 'G' weapon.
Courtesy Ministry of Defence Pattern Room, Nottingham, photo by Thomas B Dugelby

The Type 'G' – The Final Production Model FG42

The type 'G' was the final version of the FG42, its redesign so complete that no single component, not even the magazine, is interchangeable with that of the type 'E' and earlier models.

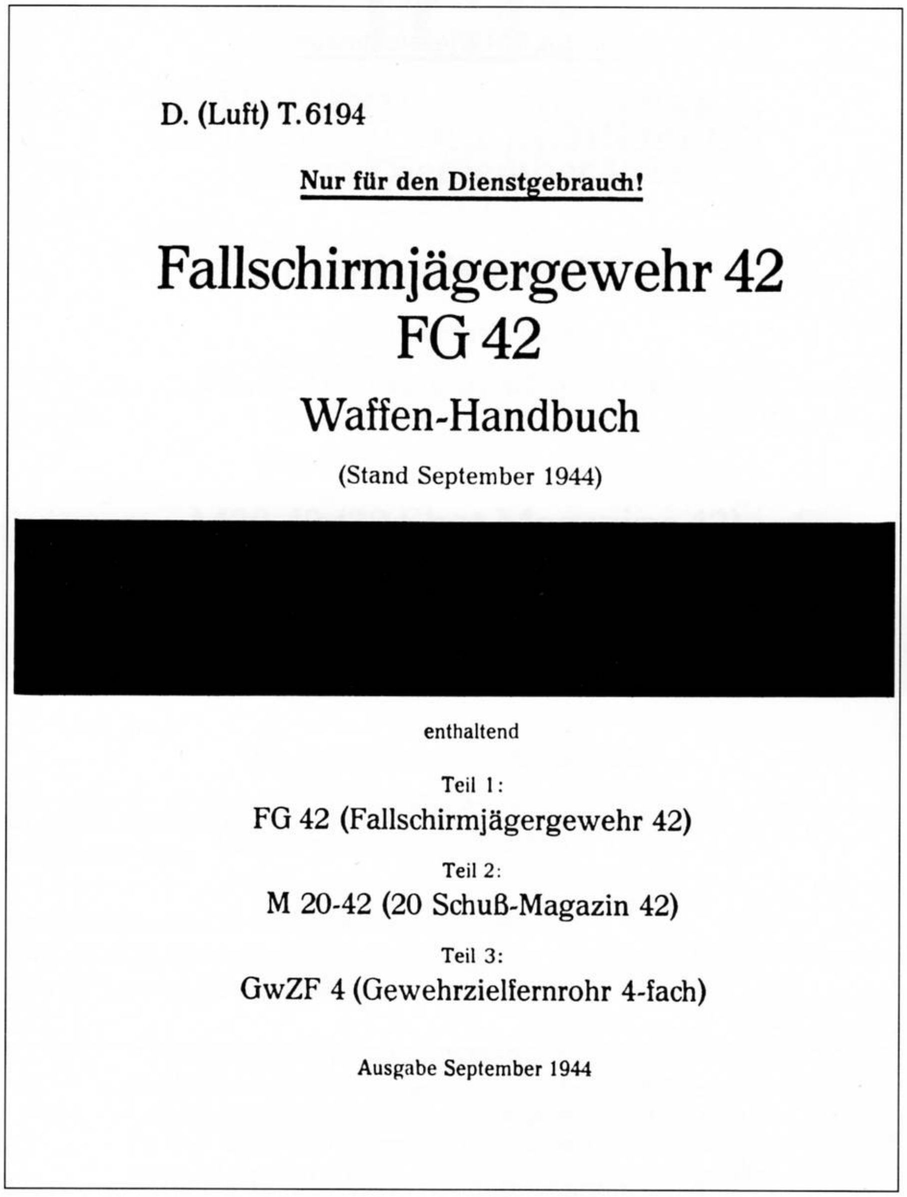
The Final Edition of the FG42 Manual

The final edition of D. (Luft) T.6194 was issued by the *Oberkommando der Luftwaffe* under date of 30 September, 1944, replacing the original FG42 manual of July, 1943 and the later *Nachtrag*. For the first and only time the illustrations and the text coincided – the weapon depicted and described was the type 'G', the last production model of the FG42.

The concept of model designations was again ignored completely, although comparison with the first edition of the manual (reprinted in chapter four, above) will reveal the considerable differences between the 'early' (type 'E') and the final (type 'G') production models.

Portions of this last FG42 manual indicate strongly that it was put together in an atmosphere of great haste and confusion, as the German text mentions several items carried over from the 1943 edition of the manual which no longer apply to the type 'G' weapon. In addition there are physical differences between some of the parts of the type 'G' model pictured and those actually fielded: for example the receiver is shown having two sets of three interrupted buffer assembly attachment threads, whereas there are two sets with only two threads each on the actual guns; and the magazine is pictured with a separate blade spring on its bottom plate, while this spring is integral on the issued magazines. For the sake of clarity the textual errors have been corrected in the translation, but the illustrations remain to substantiate that even at this late date the FG42 was still in a state of transition.

The following translation uses the official German part identifier codes, which it will be noted differ in many cases from their 1943 counterparts due to the redesign and additional components of the type 'G' FG42.



D. (Luft) T.6194

Nur für den Dienstgebrauch!

Fallschirmjägergewehr 42
FG 42

Waffen-Handbuch

(Stand September 1944)

[redacted]

enthaltend

Teil 1:
FG 42 (Fallschirmjägergewehr 42)

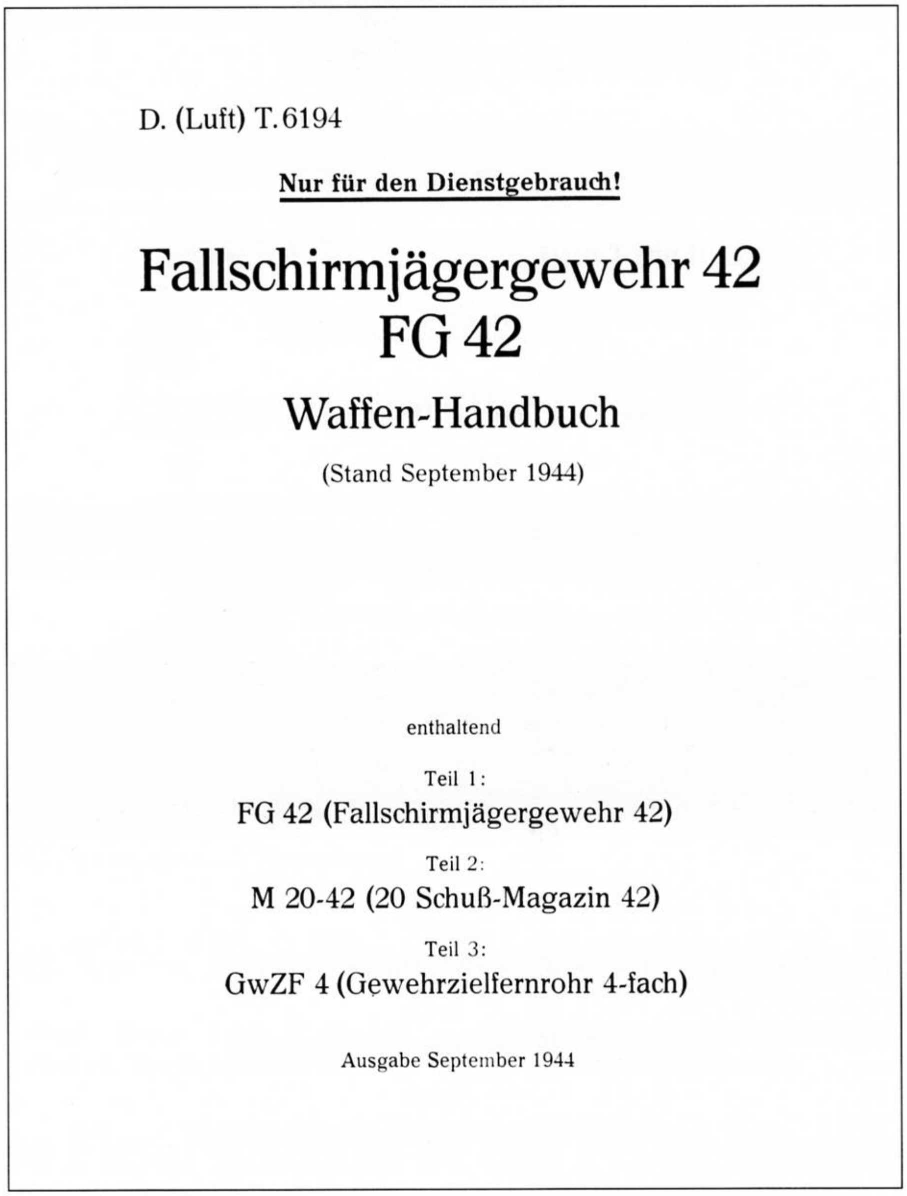
Teil 2:
M 20-42 (20 Schuß-Magazin 42)

Teil 3:
GwZF 4 (Gewehrzielfernrohr 4-fach)

Ausgabe September 1944

72. A reproduction of the cover of the final edition of the FG42 manual D. (Luft) T.6194, published on September 30, 1944. Compare with fig 21. Issued in support of the type 'G' FG42, and illustrated with pictures of that weapon. The original manual cover was "*Luftwaffe* blue" cardboard, with plain-paper dividers for Parts 1, 2 and 3 (*Teil 1, 2 und 3*).

Courtesy Lt Col (ret) Francis B Conway



D. (Luft) T.6194

Nur für den Dienstgebrauch!

Fallschirmjägergewehr 42
FG 42

Waffen-Handbuch

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Teil 1:
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Teil 2:
M 20-42 (20 Schuß-Magazin 42)

Teil 3:
GwZF 4 (Gewehrzielfernrohr 4-fach)

Ausgabe September 1944

73. A reproduction of the title page of the final edition of D. (Luft) T.6194. Compare with fig 22. The first half of the following page of translated text has been arranged to correspond line-for-line with this title page. Courtesy Lt Col (ret) Francis B Conway

D. (Luft) T.6194

Only for Service Use!

Paratrooper's Rifle 42

FG42

Weapon Handbook

(Issued September 1944)

consisting of

Part 1:

FG42 (Paratrooper's Rifle 42)

Part 2:

M20-42 (20 Shot Magazine 42)

Part 3:

GwZF 4 (Rifle Telescopic Sight 4-power)

Published September 1944

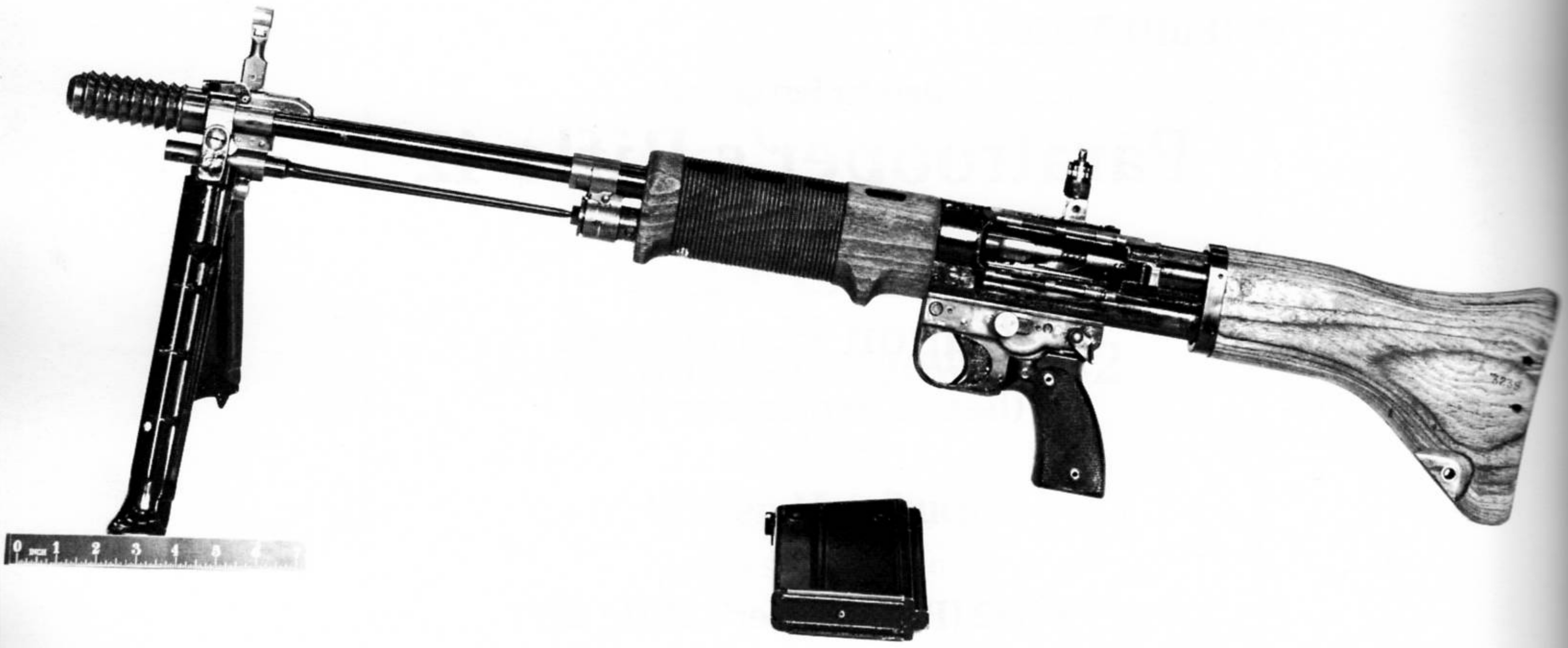
This is a secret document.
Misuse is punishable.

The Commander in Chief of the Air Force
The Chief of Air Armament Technology
Experimental Station Tarnewitz

Berlin, the 30th September 1944

I hereby certify this document D. (Luft) T.6194 — N.f.D.— "Paratrooper's Rifle 42. FG42. Weapon Handbook (Issued September 1944). Published September 1944.".
It is valid from the date of publication.
With this publication the document D. (Luft) T.6194 — N.f.D.— "FG42. Paratrooper's Rifle 42. Weapon Handbook (Issued June 1943). Published July 1943" is no longer valid and should be destroyed according to regulations.
By order of

Wittmer



74. Left side view of the type 'G' FG42 with bipod extended, showing sights raised, bayonet in stowed position and magazine well dust covers open. Aberdeen Proving Ground photo, courtesy James Alley

Part 1

FG42

Paratroopers' Rifle 42

Notice: To comprehend 'forward', 'rear', 'right', 'left', 'above' and 'under', picture the weapon in the line of sight.

I. Purpose and Characteristics

The paratrooper rifle 42, FG42, is a full automatic gas-operated weapon firing from a fully locked breech.

The weapon fires single-shot and, in emergency, in the full-automatic mode. Single fire is effected from the closed breech position; automatic from the open breech.

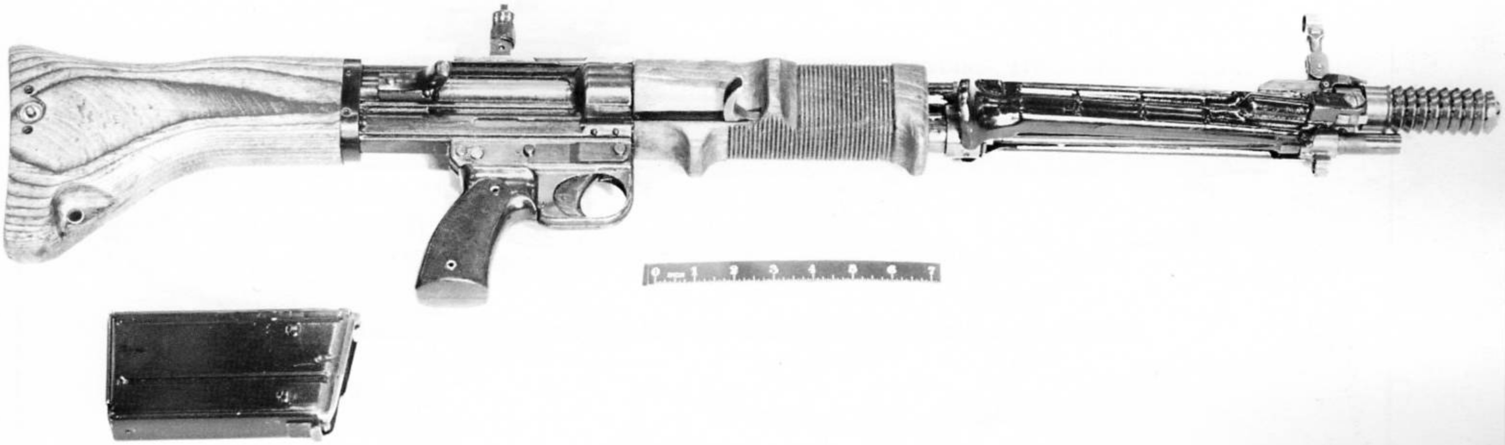
Cartridges are fed from the left side by magazines holding 20 rounds. All ammunition fired by the carbine K98k can be used.

The cartridges are fired by means of a spring-loaded firing pin.

The sight mechanism consists of a rear aperture and a front post sight. For firing from the prone position, the weapon is equipped with a folding bipod.

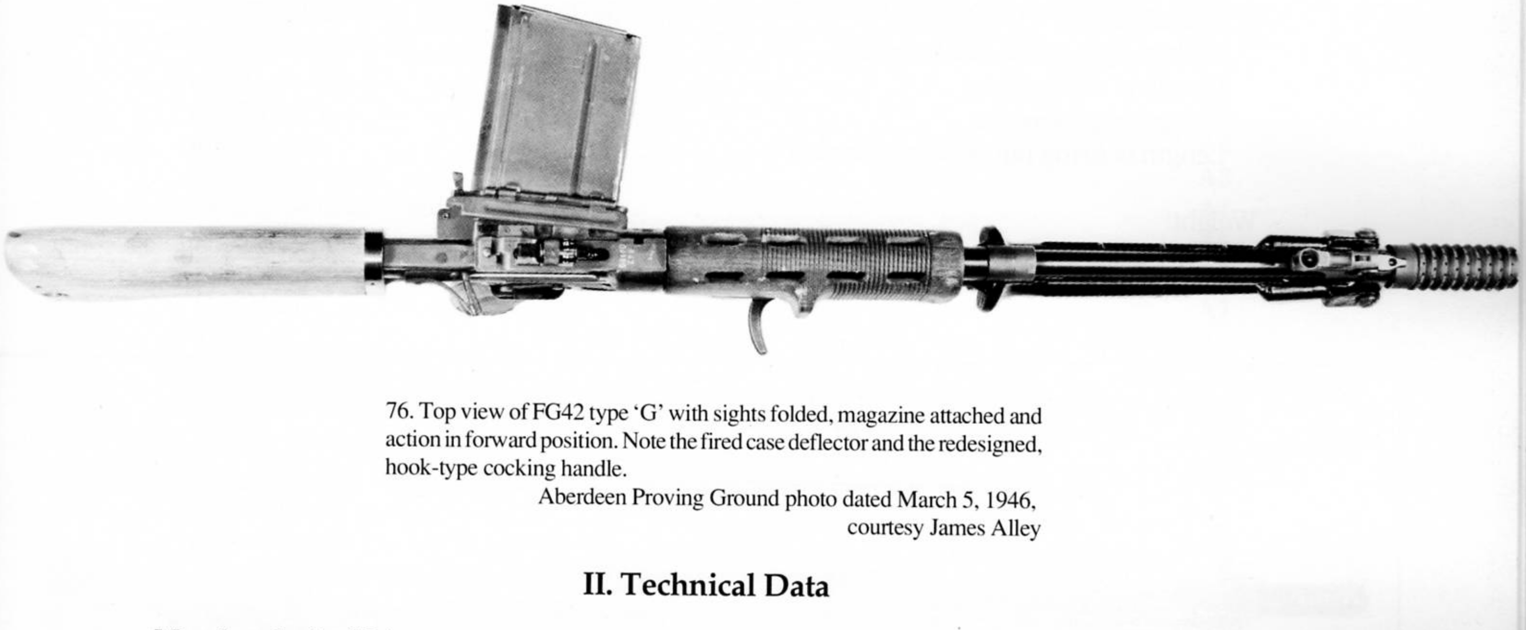
For hand-to-hand combat the weapon is equipped with a bayonet.

For sniper and sharpshooter use a telescopic sight (GwZF4) can be mounted; firing rifle grenades is accomplished by screwing the grenade launcher FG42 onto the barrel in place of the muzzle brake and mounting the grenade launcher sight FG42.



75. Right side view of FG42 type 'G' with bipod folded, showing sights raised and action in forward position.

Aberdeen Proving Ground photo, courtesy James Alley

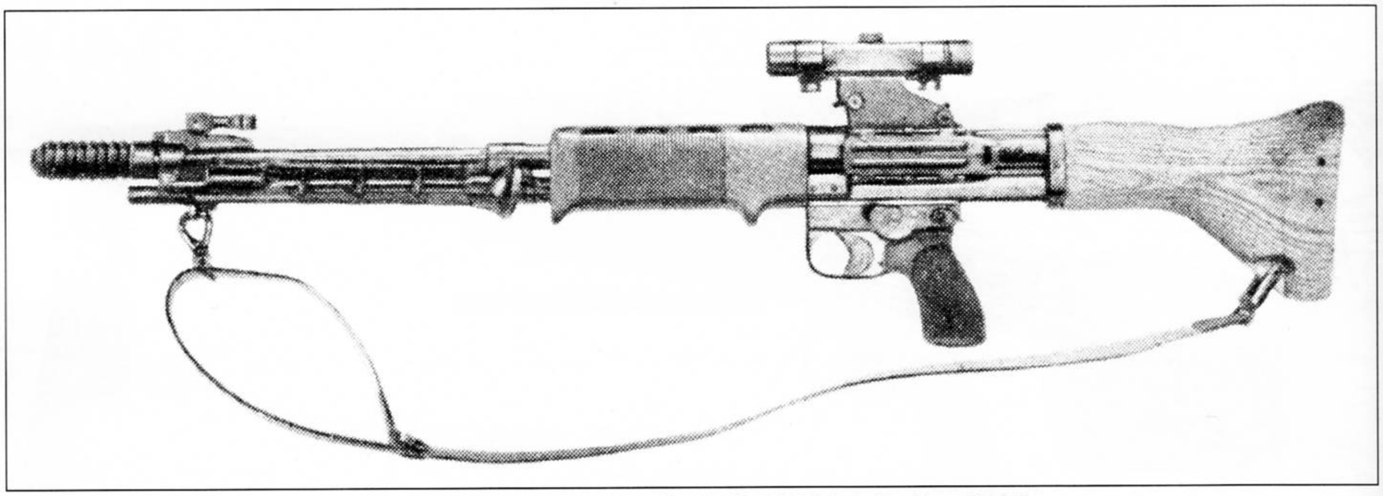


76. Top view of FG42 type 'G' with sights folded, magazine attached and action in forward position. Note the fired case deflector and the redesigned, hook-type cocking handle.

Aberdeen Proving Ground photo dated March 5, 1946, courtesy James Alley

II. Technical Data

Muzzle velocity (Vo):	
sS	725 m/s [2,379 f/s]
SmK	740 m/s [2,428 f/s]
SmKL	770 m/s [2,526 f/s]
PmK	770 m/s
Theoretical rate of fire (automatic) with M20-42	approx 750 rpm
Practical rate of fire (automatic) with M20-42	approx 200 rpm
Dimensions:	
Calibre	7.92 + 0.04mm
Number of rifling grooves	4
Diameter between grooves	8.2 + 0.05mm

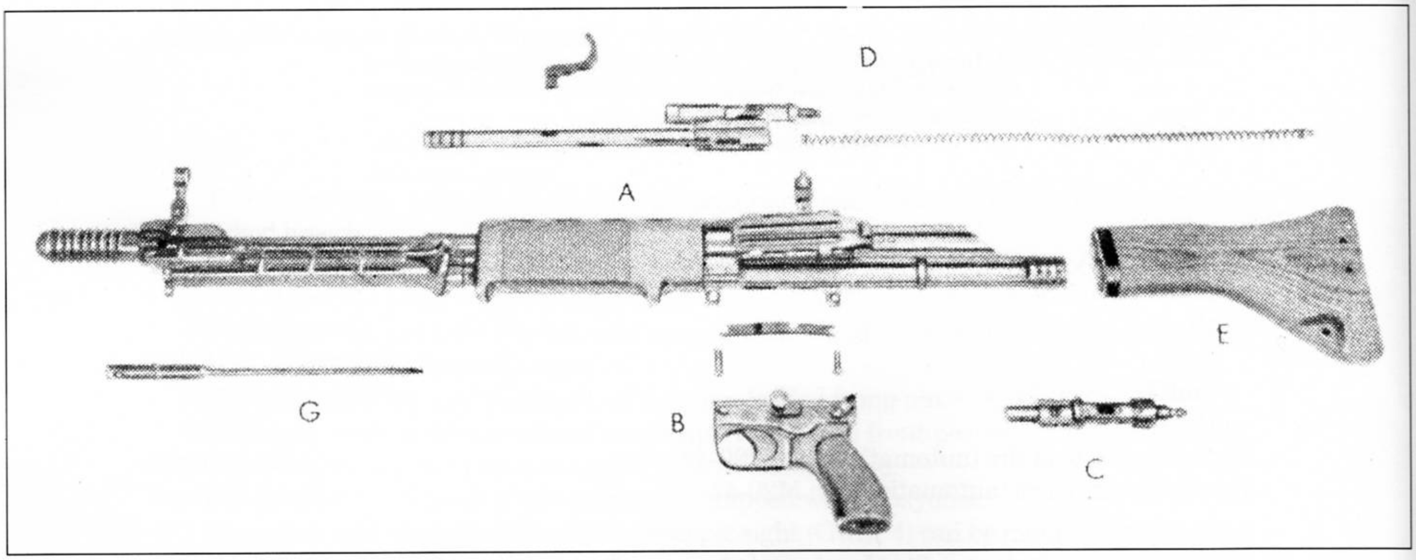


77. Fig 6 from the final edition of D. (Luft) T.6194: left side view of FG42 type 'G' fitted with sling and GwZF4 telescopic sight. Compare with fig 111: note the variation in the "swallow-tail" mount, which is without side cutouts.

Barrel length	500mm [19.69"]
Overall length	975mm [38.4"]
Rifling: right hand; one turn in	240mm [9.4"]
Length of mainspring	440 +/- 15mm
Firing pin protrusion	1.3 - 1.5mm
Length of firing pin spring, extended	110+/-5mm

Weight:

FG42 without telescope, grenade launcher or magazine	4.95kg [10.9 lbs]
magazine M20-42, loaded	0.908 kg [2.0 lbs]



78. Fig 8 from the final edition of D. (Luft) T. 6194: left side view of the type 'G' FG42 disassembled into its seven major assemblies.

III. Description

The FG42 consists of two moving and three fixed main assemblies. These are as follows:

Receiver assembly with barrel (A), fixed
Pistol grip assembly (B), fixed
Buffer assembly (C), fixed
Bolt assembly (D), moving
Butt assembly (E), moving

In addition to these main components there are the following other assemblies:

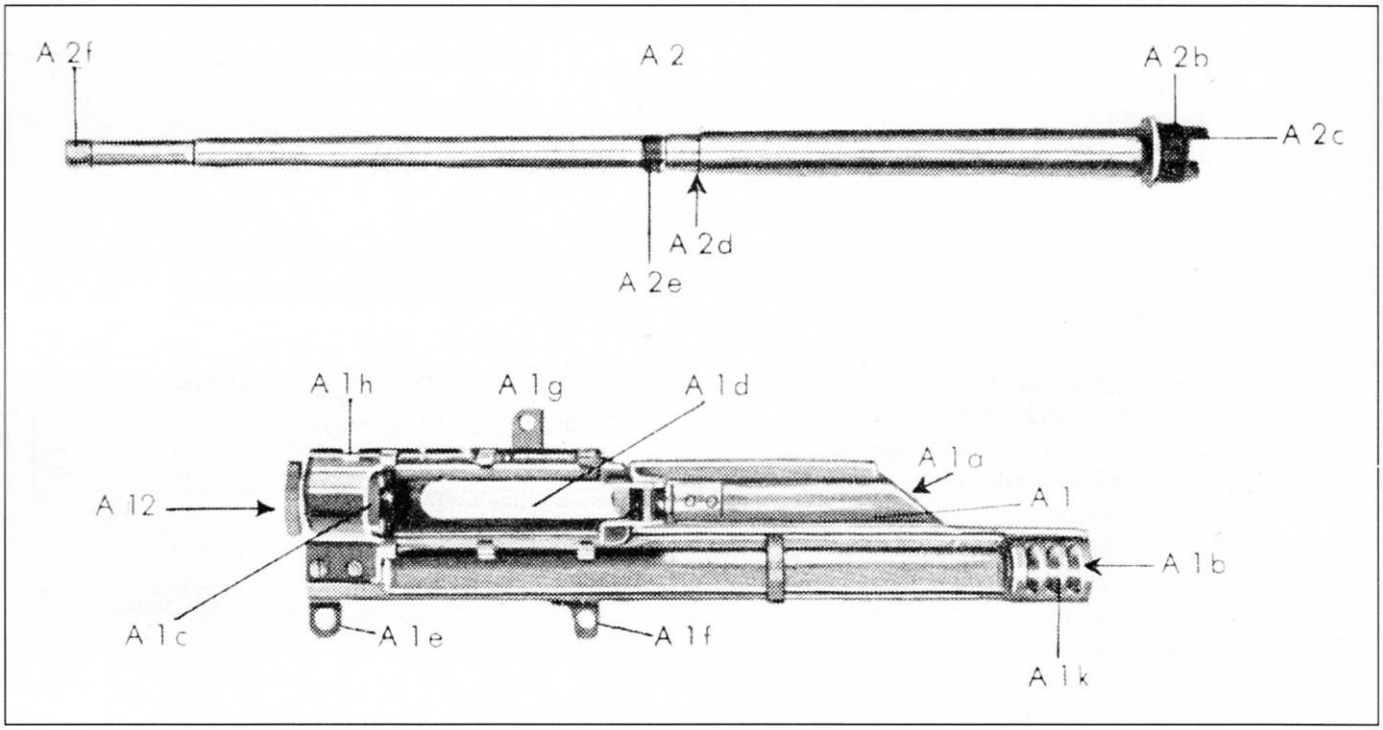
Sling assembly (F)
Bayonet assembly (G)
Telescopic sight (H)
Grenade launcher and sight (J)

A. Receiver assembly with barrel

The barrel is fixed to the receiver, wherein the bolt is carried. The cartridge is detonated in the barrel and the projectile is given direction, velocity and rotational motion. The receiver assembly consists of:

Receiver	A1
Barrel	A2
Magazine catch	A3
Magazine catch retaining pin	A4
Bipod leg plunger spring	A5
Front sight hood	A6
Gas block	A7
Ejector	A8
Ejector retaining pin	A9
Magazine catch/ejector spring	A10
Muzzle brake catch plunger	A11
Gas block lock nut	A12
Bipod mount	A13
Muzzle brake mounting sleeve	A14
Front sight/bayonet block	A15
Muzzle brake catch	A16
Muzzle brake catch spring	A17
Muzzle brake catch retaining pin	A18
Gas cylinder cap	A19
Bipod leg, right	A20
Bipod leg, left	A21
Bipod leg retaining screw	A22
Spring housing with roller	A23
Rear sight body	A24
Rear sight elevation ring	A25
Rear sight locking clip	A26
Rear sight post	A27
Rear sight spring guide	A28

Rear sight spring	A29
Rear sight detent spring	A30
Rear sight pivot pin	A31
Front sight body	A32
Front sight blade	A33
Front sight detent plunger	A34
Front sight detent spring	A35
Front sight pivot pin	A36
Muzzle brake	A37
Handguard	A38
Gas cylinder	A39
Gas regulator	A40
Gas regulator retaining spring	A41
Dust cover, upper	A42
Dust cover, lower	A43
Dust cover retaining pin	A44
Dust cover retaining pin spring, upper	A45
Dust cover retaining pin spring, lower	A46
Reinforcing ring	A47



79. Fig 9 from the final edition of D. (Luft) T.6194: left side view of FG42 type 'G' receiver assembly with barrel, disassembled and stripped.

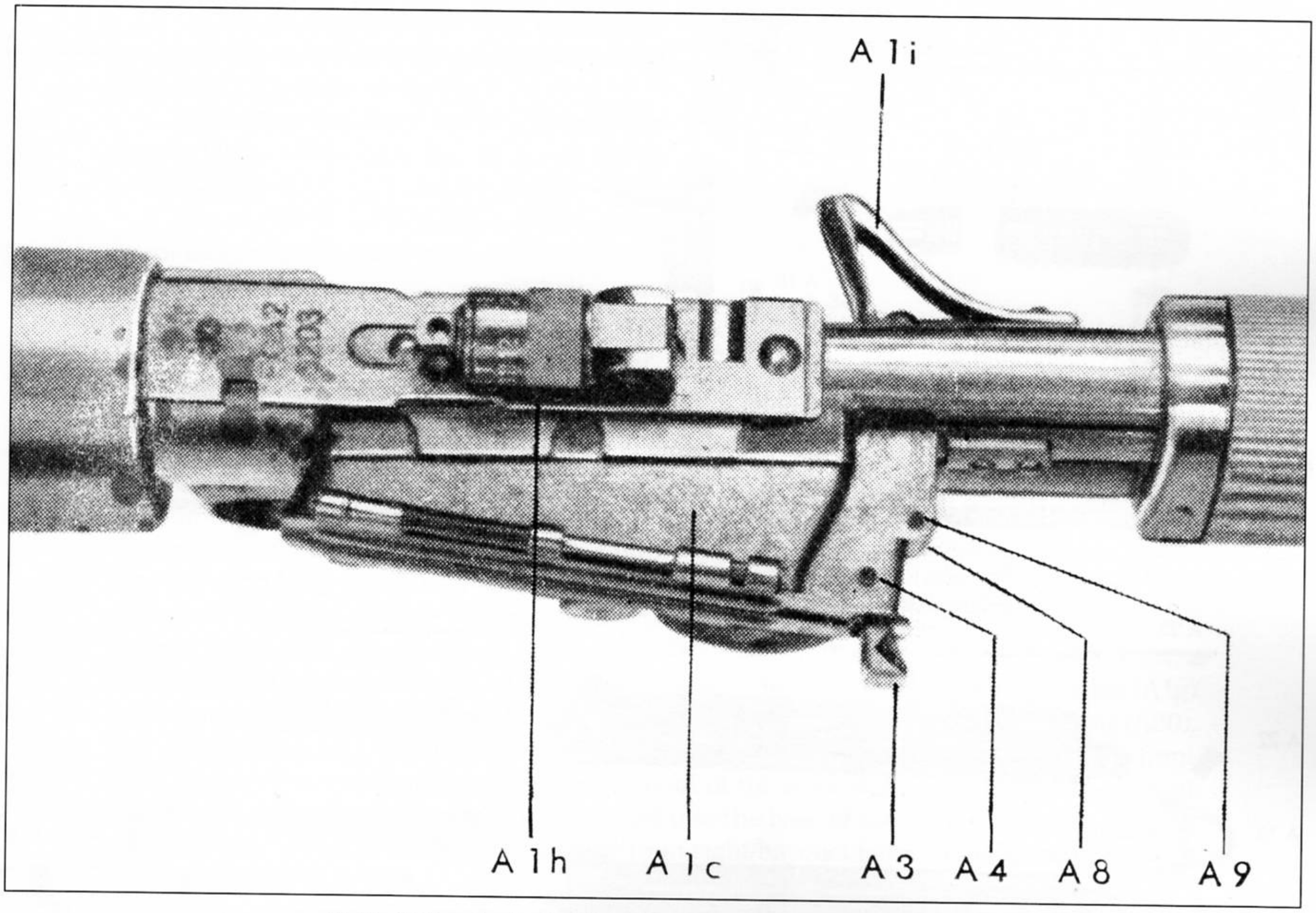
The barrel (A2) is rigidly screwed into the receiver (A1). The receiver has two longitudinal bores (A1a and A1b) which serve to guide the bolt assembly (D). The magazine well (A1c) is on the left hand side of the receiver, and the ejection port (A1d), together with the fired case deflector (A1i), are on the right. On the lower surface of the receiver are the forward (A1e) and rear (A1f) retainers for the pistol grip assembly (B).

To retain the magazine, the magazine catch (A3) and its pin (A4) are mounted at the rear of the magazine well (A1c).

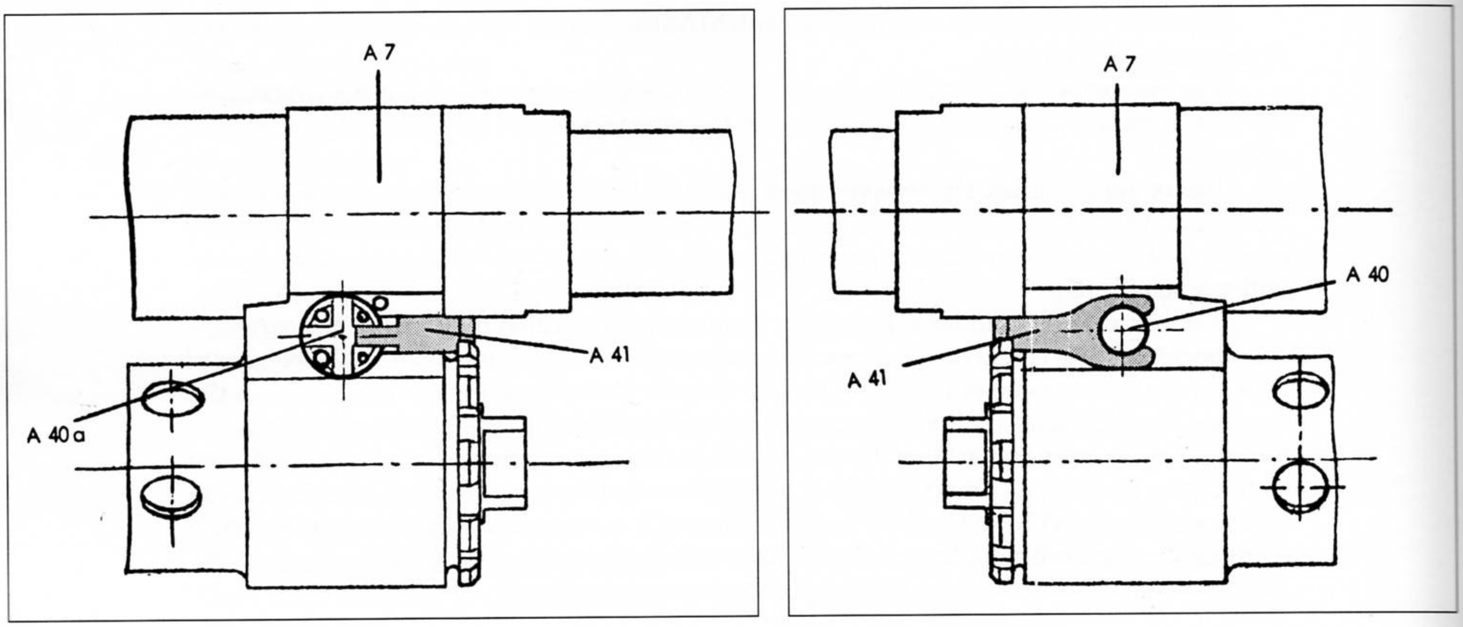
The ejector (A8) is mounted in the rear part of the magazine well, and is held in place by the ejector retaining pin (A9). The ejector and the magazine catch are operated by the same spring (A10).

On its upper surface the receiver has a lug (A1g) to receive the rear sight assembly and a dovetailed bar (A1h) onto which the telescopic and grenade sights are mounted. The lower bore (A1b) of the receiver has two sets of interrupted threads (A1k) at the rear to retain the buffer assembly (C).

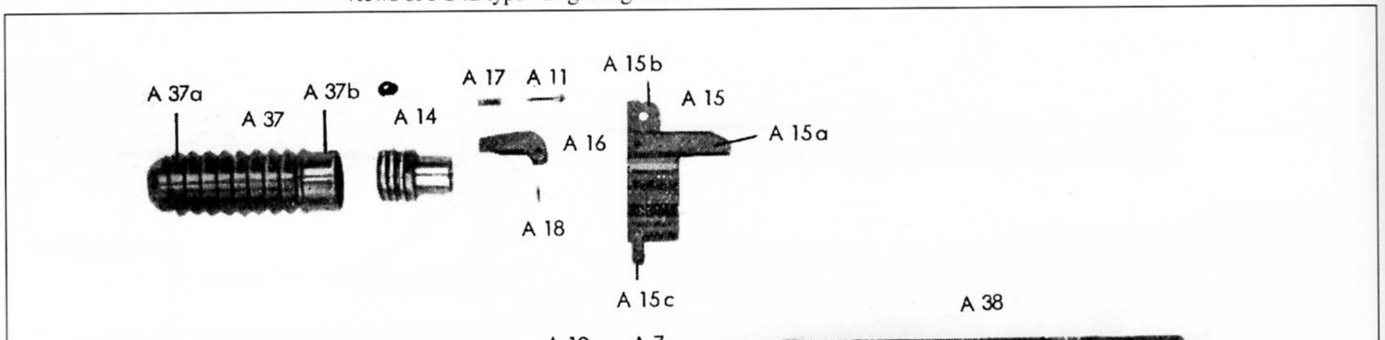
The barrel is 500mm long. Internally it consists of the rifled portion and the cartridge chamber (A2a). The rifling has four grooves with a constant right hand pitch, with one turn in 240mm. On the rear end of the barrel are the threads (A2b) for screwing the barrel into the receiver. In addition two bolt locking cams (A2c) are machined in. In the centre section of the barrel a locating step is machined for the gas block, and a transverse gas port (A2d) is drilled through the barrel wall. Directly in front of this there is a threaded section (A2e) for the gas block locking nut (A12). At the front end of the barrel is a stepped and threaded portion (A2f) for mounting the front sight/bayonet block (A15) with the muzzle brake mounting sleeve (A14), which retains the muzzle brake (A37) and the grenade launcher 42.



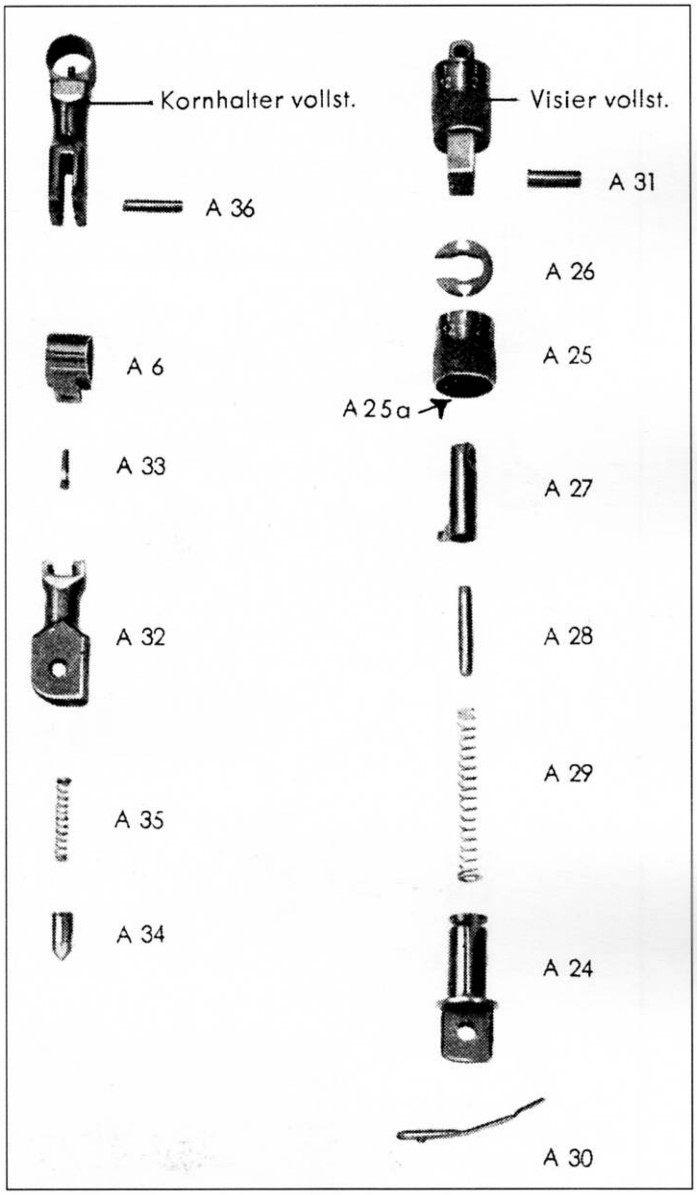
80. Fig 10 from the final edition of D. (Luft) T.6194: top view of FG42 type 'G' receiver assembly showing rear sight, magazine catch and fired case deflector.



81. Fig 11 from the final edition of D. (Luft) T.6194: right and left side views of FG42 type 'G' gas regulator.



82. Fig 12 from the final edition of D. (Luft) T.6194: left side view of FG42 type 'G' muzzle brake, front sight, gas cylinder, gas block, bipod and handguard components, disassembled.



83. Fig 13 from the final edition of D. (Luft) T.6194: FG42 type 'G' front and rear sights, disassembled.

The gas block (A7) has a horizontal transverse boring to accept the gas regulator (A40), and machined slots for the gas regulator spring (A41) which holds the gas regulator in one of its four positions. On the head of the gas regulator are four differently sized indentations, from small to large, aligned with the slots cut into the shaft of the regulator.

The cylindrical muzzle brake mounting sleeve (A14) is threaded internally and externally to half its length, and has external mounting flats.

The upper ring of the front sight/bayonet block (A15) is slid onto the barrel, the bayonet (G) being located in the lower ring. The upper square bar (A15a) of the block is aligned with a corresponding flat machined onto the top surface of the barrel and holds the lug (A15b) for the front sight body (A32).

On the underside of the front sight/bayonet block is a ring (A15c) for attachment of the snap hook (F2) of the sling (F).

In addition the square bar (A15a) holds the muzzle brake catch (A16) and its spring (A17), retaining pin (A18), and plunger (A11).

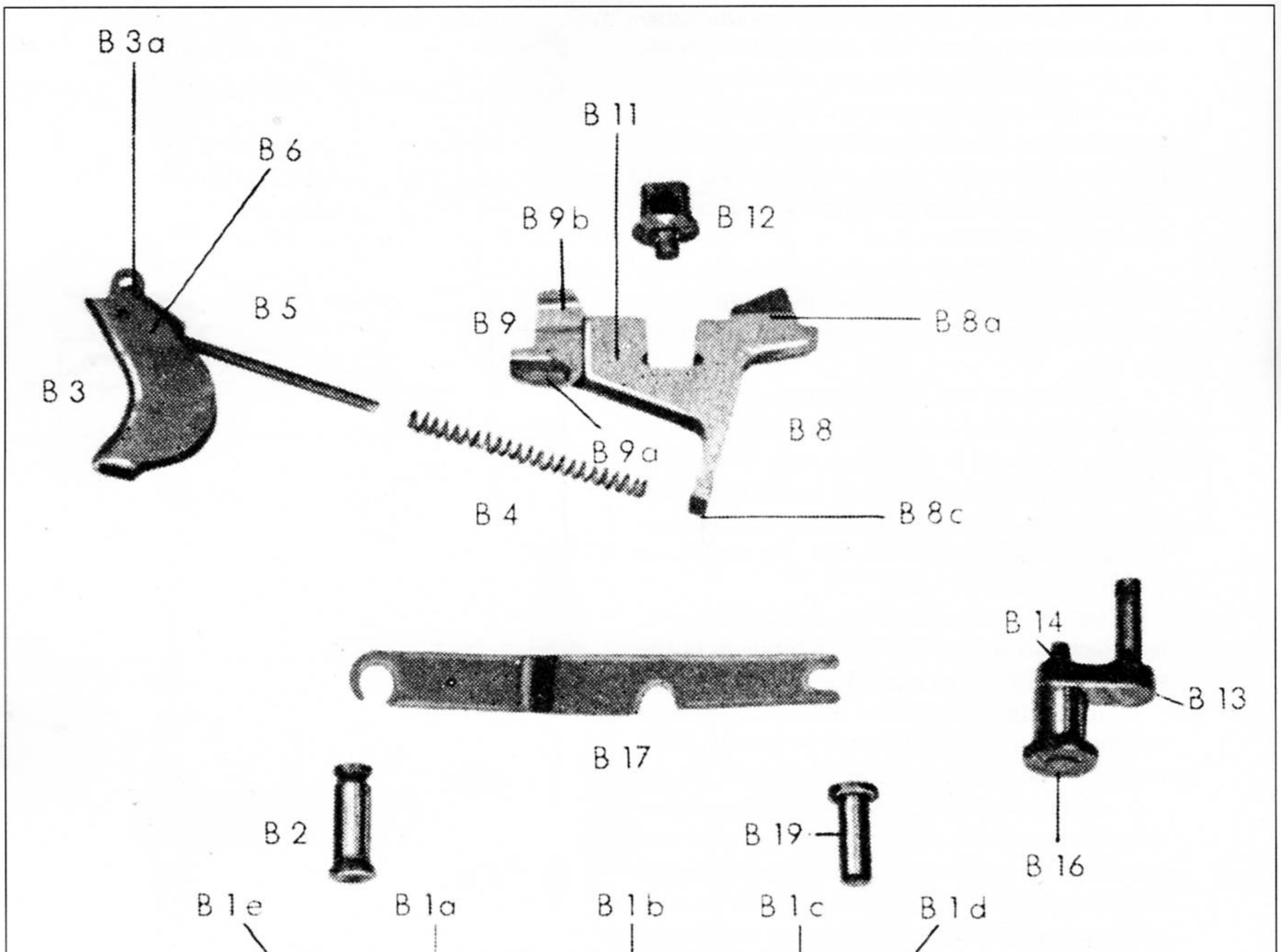
The muzzle brake (A37) is a hollow cylindrical body with its outer surface serrated and pierced with numerous gas escape holes, and mounting flats on its front end (A37a). Its rear end is threaded internally to screw it onto the muzzle brake mounting sleeve (A14), and has a notch (A37b) to accept the muzzle brake catch (A16).

The diopter rear sight assembly consists of the rear sight post (A27) together with its elevating guide (A28) and spring (A29), fitted into the rear sight body (A24), and adjusted by the elevation ring (A25) which is held against inadvertent adjustment by its detent (A25a), and secured by the locking ring (A26). The rear sight assembly is fastened to the receiver lug (A1g) by the pivot pin (A31), and is held in the raised or lowered position by the detent spring (A30).

In the front sight assembly, the front sight blade (A33) threads into the base of the front sight hood (A6), which is retained in the dovetail of the front sight body (A32). The detent plunger (A34) and its spring (A35) are inserted into the base of the front sight body, and the assembly is retained on the lug (A15b) of the front sight/bayonet block (A15) by the front sight pivot pin (A36).

The handguard (A38) protects the supporting left hand of the firer from burns from the heated barrel. The upper hole of the handguard is fitted over the barrel and the handguard, together with its reinforcing ring (A47), are retained by the gas block (A7) and the gas block lock nut (A12).

The gas cylinder (A39) is inserted through the lower holes of the gas block and the



84. Fig 17 from the final edition of D. (Luft) T.6194: left side view of FG42 type 'G' pistol grip assembly, stripped.

handguard, and is secured by the threaded gas cylinder cap (A19), the front end of which forms a four-sided mounting nut, hollowed out to receive the point of the stowed bayonet (G). The slotted rear end of the gas cylinder (A39) is secured against turning by a pin rivetted into the front of the receiver.

The bipod mount (A13) has a lug (A13a) on either side to which are mounted the bipod legs (A20 and A21) by means of the bipod leg retaining screws (A22), which allow the bipod legs to rotate into the open or closed positions. The bipod assembly is retained on the barrel between the muzzle brake mounting sleeve (A14) and the front sight/bayonet block (A15).

B. Pistol grip assembly

The pistol grip assembly contains the trigger mechanism and consists of the following:

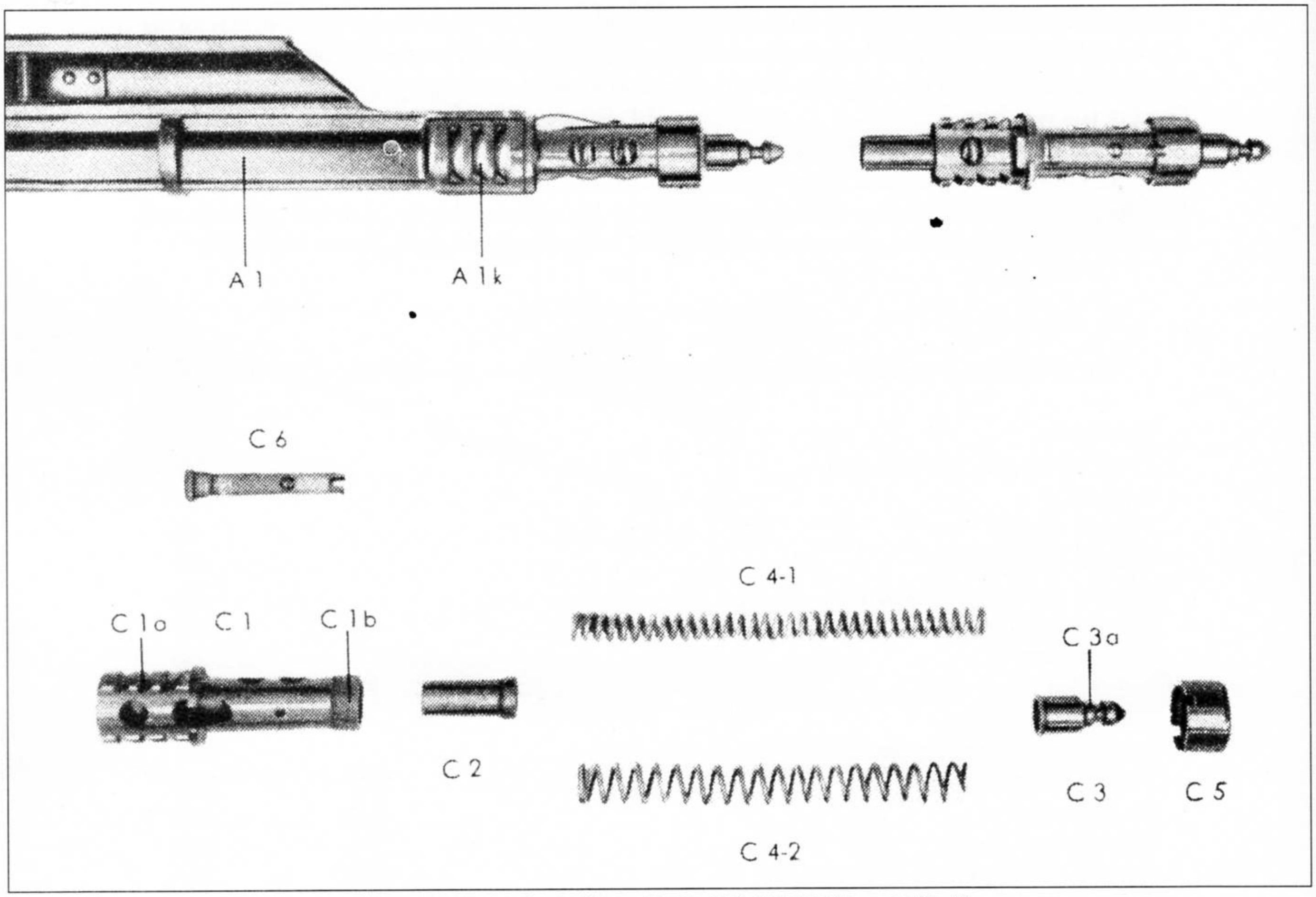
Pistol grip	B1
Front pistol grip retaining pin	B2
Trigger	B3
Trigger spring	B4
Trigger spring guide	B5
Trigger spring guide axis pin	B6
Trigger axis pin	B7
Trigger lever	B8
Interruptor	B9
Interruptor spring	B10
Interruptor retaining pin	B11
Trigger lever bearing	B12
Fire selector	B13
Fire selector detent	B14
Fire selector detent spring	B15
Fire selector detent head	B16
Pistol grip pin retaining plate	B17
Safety catch	B18
Rear pistol grip retaining pin	B19

The pistol grip assembly (B) is located on the underside of the receiver (A1), and is attached by the front and rear retaining pins (B2 and B19) inserted through the receiver lugs (A1e and A1f). The safety catch (B18) rotates in the hole (B1c). The front and rear retaining pins (B2 and B19) are stationary in the holes (B1e and B1d). The trigger spring (B4) and spring guide (B5) are rotatably attached to the trigger by the trigger guide axis pin, and the trigger assembly is rotatably attached to the pistol grip by the trigger axis pin (B7) in the hole (B1a).

The trigger lever assembly (B8), to which is connected the interruptor (B9), the interruptor spring (B10) and the interruptor retaining pin (B11), turns on the trigger lever bearing (B12). The upper rear of the trigger lever is configured as the sear (B8a). The fire selector (B13) is located in the hole (B1b) in the pistol grip. The trigger (B3), together with its spring (B4) and guide (B5), pivots about the trigger axis pin (B7) through the hole (B3a) in the trigger, and the lower end of the trigger spring (B4) is supported by the lower arm (B8c) of the trigger lever.

The fire selector (B13) contains the detent (B14), its spring (B15) and head (B16). The detent is inserted into one of two indentations in the pistol grip to provide single 'E' or automatic 'D' fire.

The pins (B2), (B7), (B13) and (B18) are secured in the pistol grip by the retaining plate (B17) which prevents them from falling out. The retaining pin (B19) is secured by the safety catch.



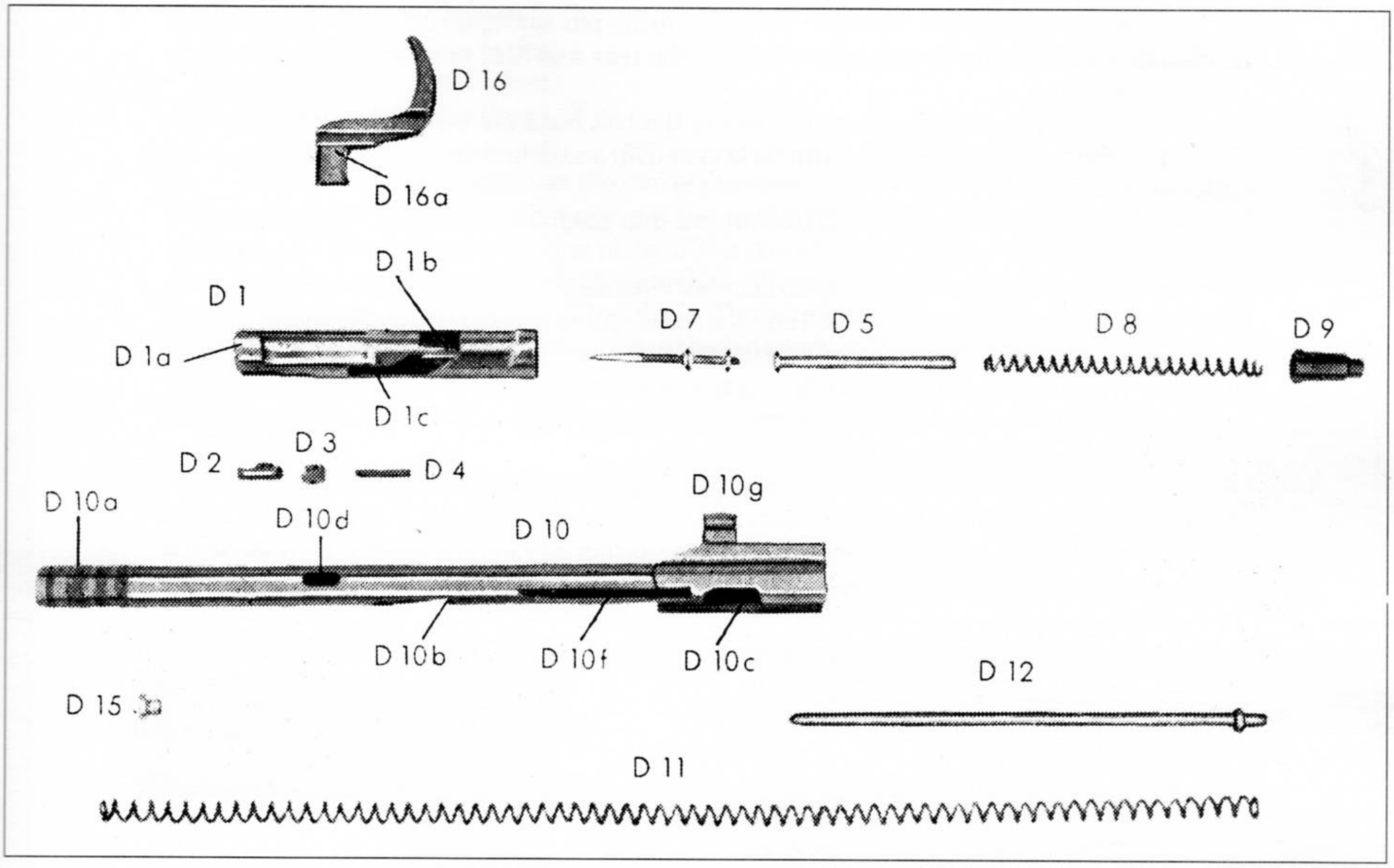
85. Fig 18 from the final edition of D. (Luft) T.6194: FG42 type 'G' buffer assembly, installed in receiver (above) and buffer components, disassembled.

C. Buffer assembly

The buffer assembly contains the inner and outer buffer springs, which absorb the recoil of the weapon. It consists of:

Buffer housing	C1
Buffer bushing, front	C2
Buffer bushing, rear	C3
Buffer spring, inner	C4-1
Buffer spring, outer	C4-2
Buffer lock nut	C5
Buffer lock spring	C6

The buffer housing (C1) has two sets of interrupted threads (C1a) for locking the buffer assembly into the corresponding interrupted threads (A1k) in the receiver. The rear of the buffer housing is threaded for attachment of the lock nut (C5), which is secured by the rear end of the buffer lock spring (C6). The front end of the buffer lock spring locks the buffer assembly in the receiver. The front buffer bushing (C2), the rear buffer bushing (C3) and between them the two buffer springs (C4-1 and C4-2), one inside the other, are inserted inside the buffer housing.



86. Fig 20 from the final edition of D. (Luft) T.6194: FG42 type 'G' bolt assembly components, disassembled.

D. Bolt assembly

The bolt guides the cartridge into the barrel and locks it in place. It detonates the inserted cartridge and effects the extraction and ejection of the empty cartridge case after firing. The bolt assembly consists of:

Bolt head	D1
Extractor	D2
Extractor keeper	D3
Extractor keeper spring	D4
Firing pin spring guide	D5
Firing pin	D7
Firing pin spring	D8
Firing pin spring retainer	D9
Gas piston	D10
Mainspring	D11
Mainspring guide	D12
Cocking handle retaining button	D15
Cocking handle	D16

The bolt head (D1) is a hollow cylindrical object with a curved, camming slot (D1b) terminating in a straight slot (D1c) cut in its circumference, which receives the yoke (D10g) of the gas piston, carrying the firing pin (D7). The firing pin spring (D4) and firing pin spring guide (D5) are inserted into the bolt head from the rear and held in by the firing pin spring retainer (D9).

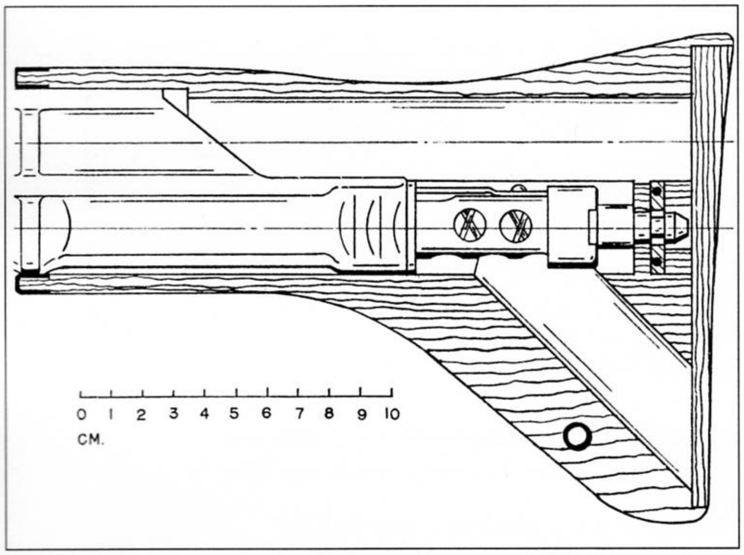
On the outer circumference of the front of the bolt head are two opposing locking lugs (D1a). The extractor (D2), together with its keeper (D3) and detent spring (D4), sits in a recess between these lugs.

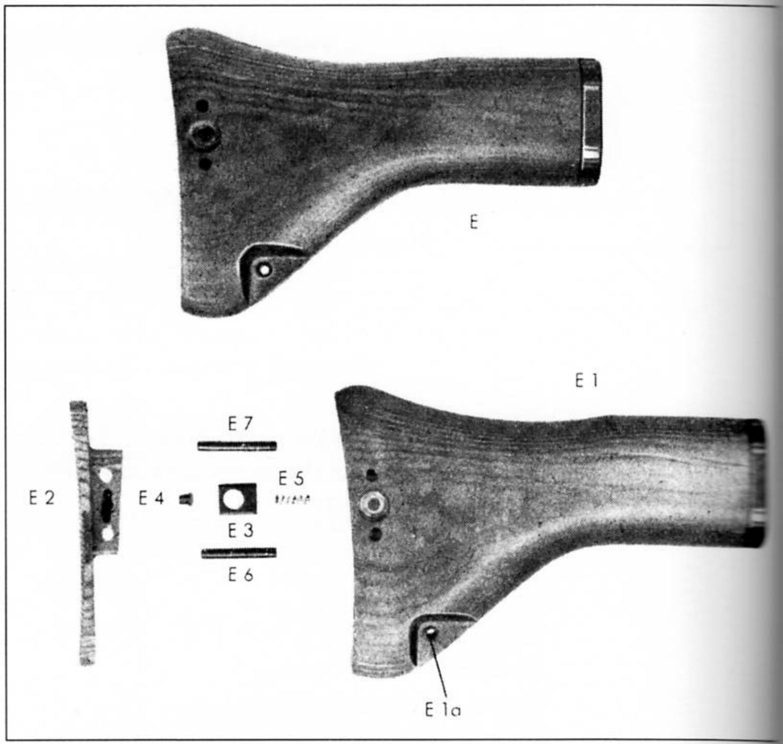
Annular gas sealing grooves (D10a) are cut into the front of the outer circumference of the gas piston.

The interior of the hollow gas piston houses the mainspring (D11), with the cocking handle retaining button (D15) at its front end and the recoil spring guide (D12) at the rear.

The sear (B8a) of the trigger lever engages the gas piston recesses (D10b or D10c), according to the fire mode (single fire 'E' or automatic fire 'D') selected. The base of the cocking handle (D16) fits into the slot (D10d) in the gas piston, and is secured by the retaining button (D15) seating in its rear recess (D16a).

The firing of single shots only in the single fire mode ('E' fire selection) is accomplished by the upper edge (B9b) of the interruptor (B9) reaching the front of the track (D10f) in the rearward-moving gas piston and being pivoted aside, disengaging the lower edge (B9a) of the interruptor from the step in the trigger.





87. Above: left side sectional drawing of the type 'G' FG42 buttstock, showing its internal construction and method of seating on the rear buffer bushing. Drawing by Thomas B Dugelby
Right: Fig 21 from the final edition of D. (Luft) T.6194: right side view of FG42 type 'G' butt assembly and butt components, disassembled.

E. Butt assembly

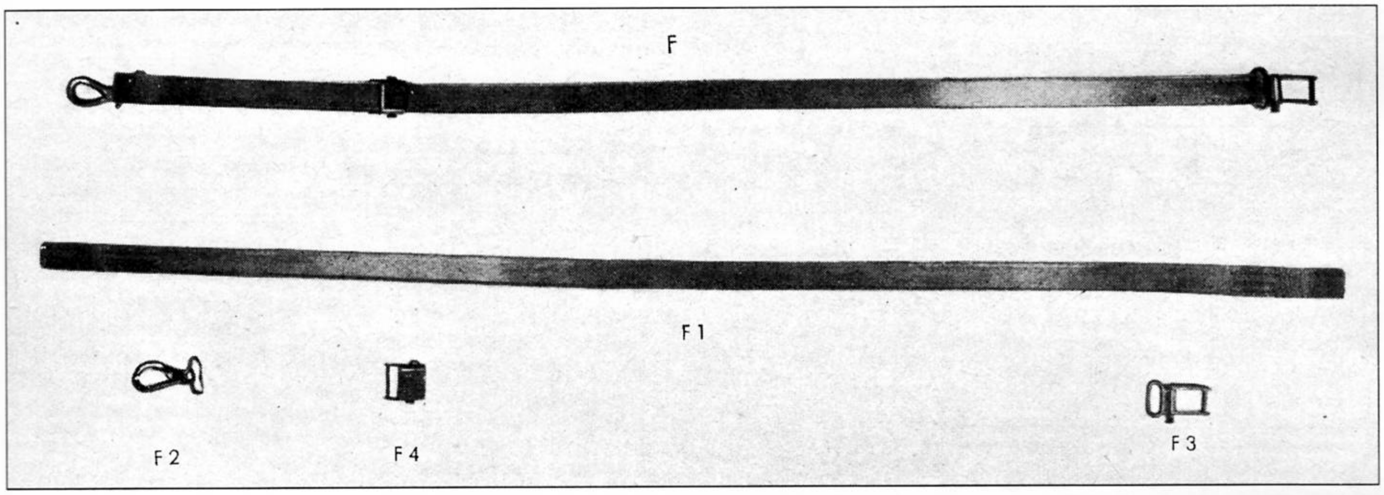
The buttstock slides over the rear of the receiver, and serves to hold the weapon against the shoulder.

The buttstock consists of:

Buttstock	E1
Butt plate	E2
Buttstock locking plate	E3

Buttstock takedown button	E4
Buttstock locking plate spring	E5
Buttplate retaining pin (short)	E6
Buttplate retaining pin (long)	E7

The buttstock (E1) is slid over the rear of the receiver (A1) and is retained by the buttstock locking plate (E3) seating in the groove (C3a) in the rear buffer bushing (C3) of the buffer assembly (C). The buttstock locking plate (E3) is moved by the locking plate spring (E5) and the takedown button (E4) in the butt plate (E2). All are held together in the middle between the short and long retaining pins (E6 and E7). The takedown button (E4) is acted upon by the locking plate spring (E5). The hole (E1a) in the buttstock receives the sling clip (F3).



88. Fig 22 from the final edition of D. (Luft) T.6194: FG42 type 'G' sling assembly (above) and sling components, disassembled.

F. Sling assembly

The sling serves to carry the weapon, and consists of the following:

Sling	F1
Sling snap hook	F2
Sling clip	F3
Sling keeper assembly	F4

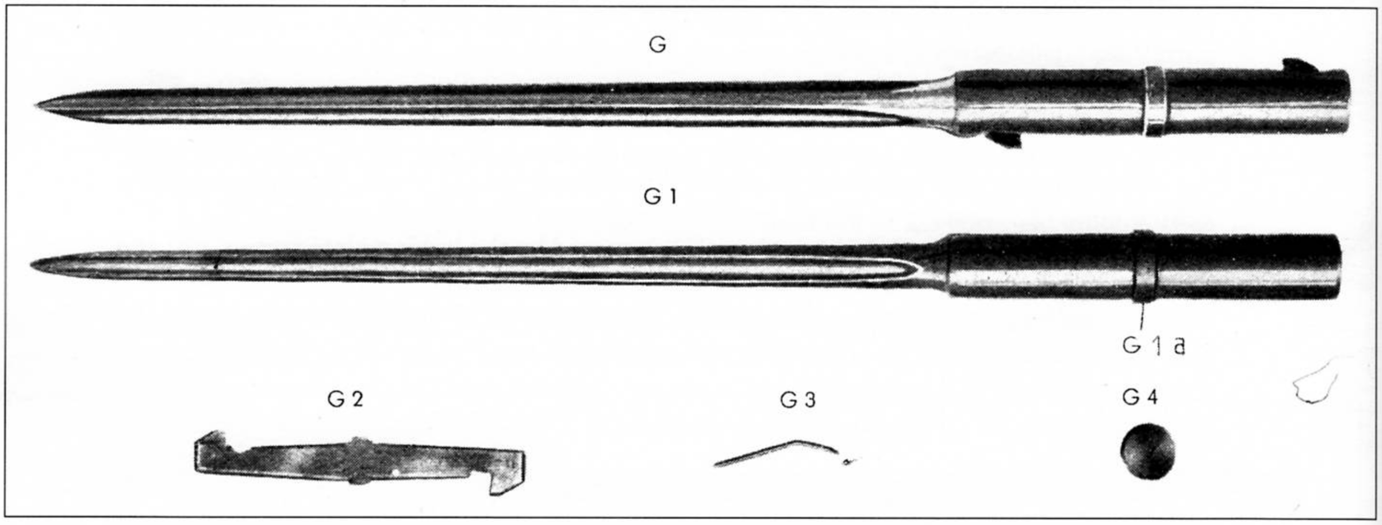
G. Bayonet assembly

The bayonet is mounted for close combat, and consists of the following:

Bayonet blade	G1
Bayonet lock	G2
Bayonet lock spring	G3
Bayonet end disc	G4

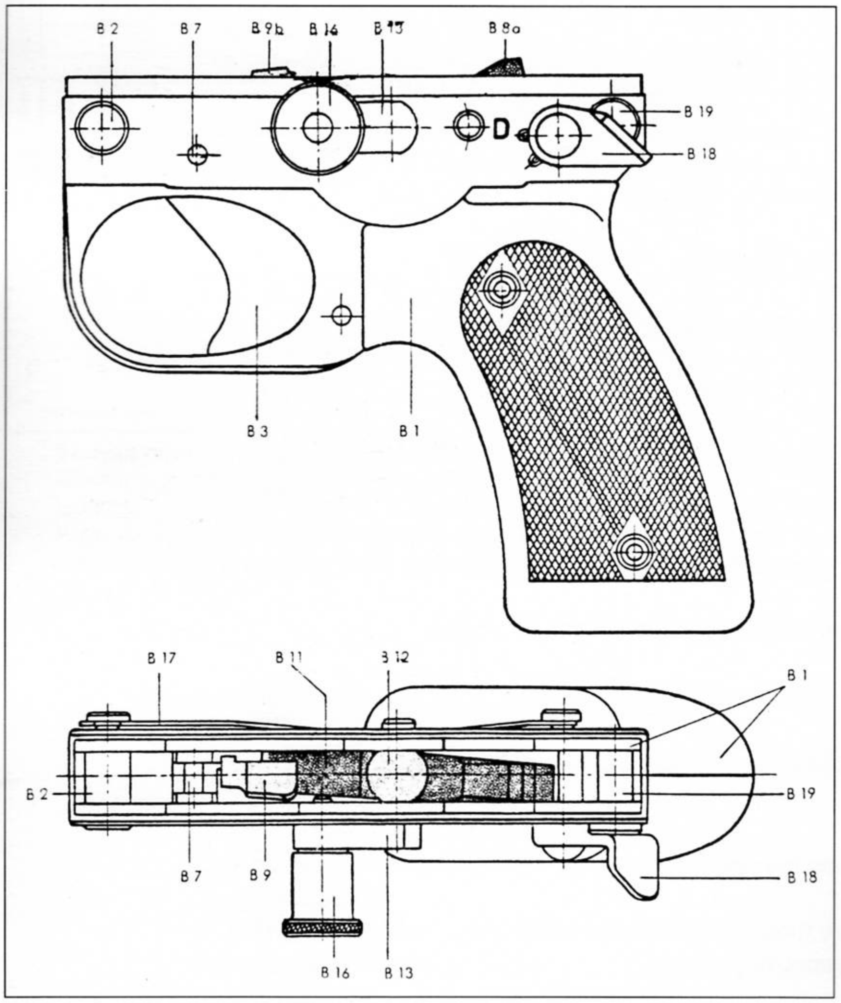
The cruciform bayonet blade (G1) has four grooves in cross section; a raised ring (G1a) provides a grip while mounting.

The lock (G2) and lock spring (G3) are mounted inside the hollow haft and serve together with the raised ring (G1a) to hold the bayonet in position.



89. Fig 23 from the final edition of D. (Luft) T.6194, showing the FG42 type 'G' bayonet assembly (above) and bayonet components, disassembled.

The end disc (G4) seals the open rear end of the hollow haft. In the stowed position the point of the bayonet blade is located in the hollow front end of the mounting nut formed on the gas cylinder cap (A19).



90. Fig 15 from the final edition of D. (Luft) T.6194: left side view of type 'G' pistol grip assembly with fire selector set at 'E' for single fire. Below: top view of pistol grip assembly set for single fire. Note the position of the sear (B8a) and the interruptor (B9).

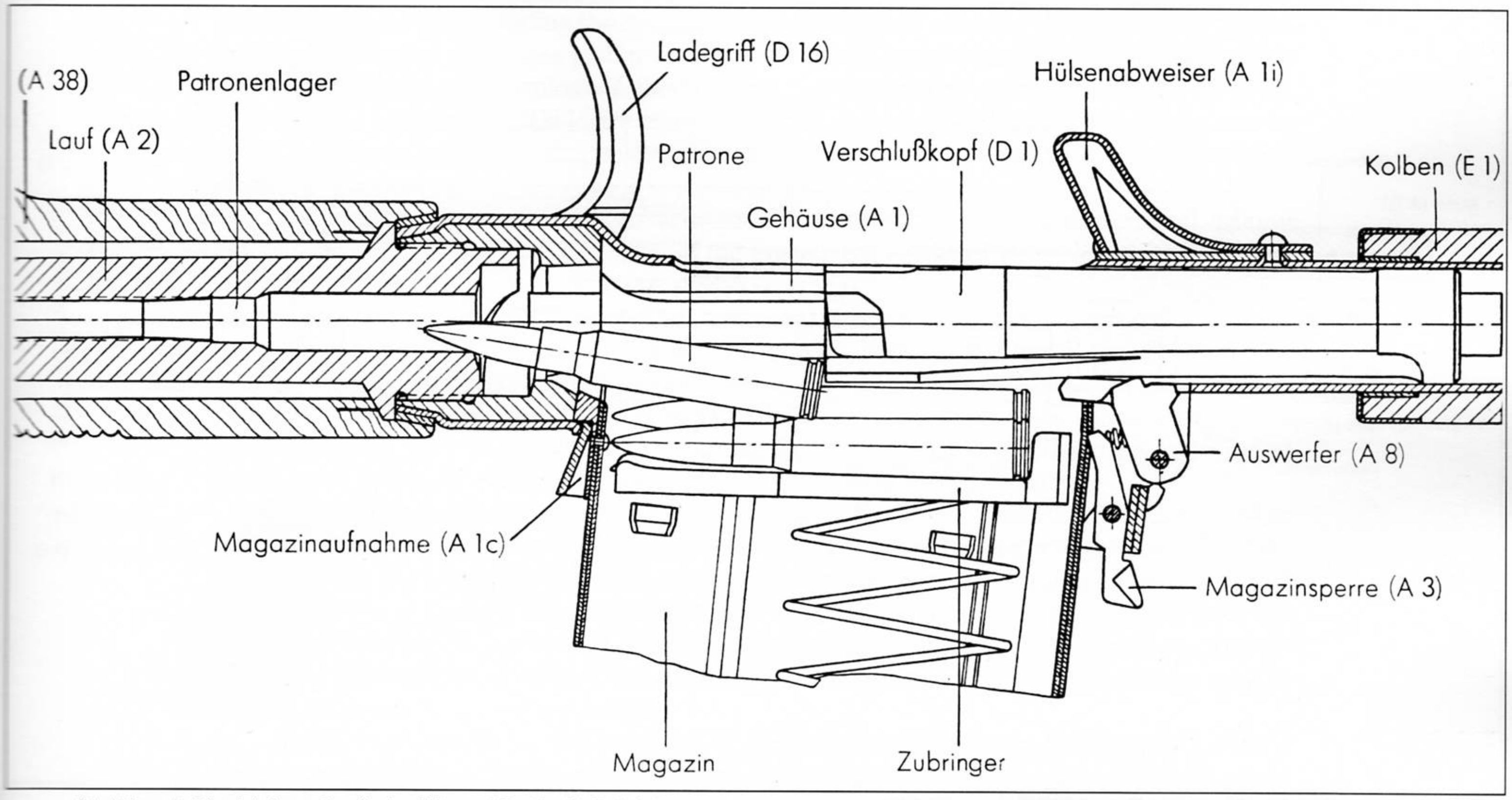
IV. Method of Operation

A. Single fire

The fire selector is set to 'E' for single fire. In this position, the fire selector detent (B14) moves the rear of the trigger lever (B8) with its sear (B8a) to the left on the bearing (B12). The sear is now in the path of the single fire recess (D10c) of the gas piston. At the same time, the fire selector detent (B14) has moved the interruptor (B9) on the front of the trigger lever to the right, where the lower edge of the interruptor (B9a) is in line with the step in the rear of the trigger (B3), and the upper edge of the interruptor (B9b) is within the track (D10f) of the gas piston.

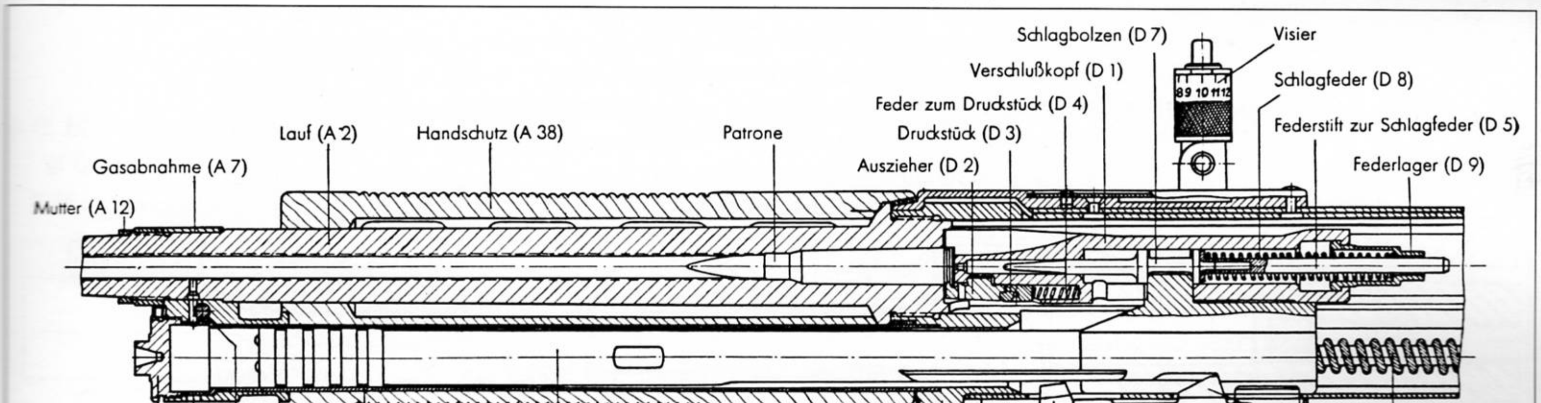
The bolt is forward and locked. A loaded magazine is inserted. By pulling back the cocking handle (D16) a round is loaded; that is:

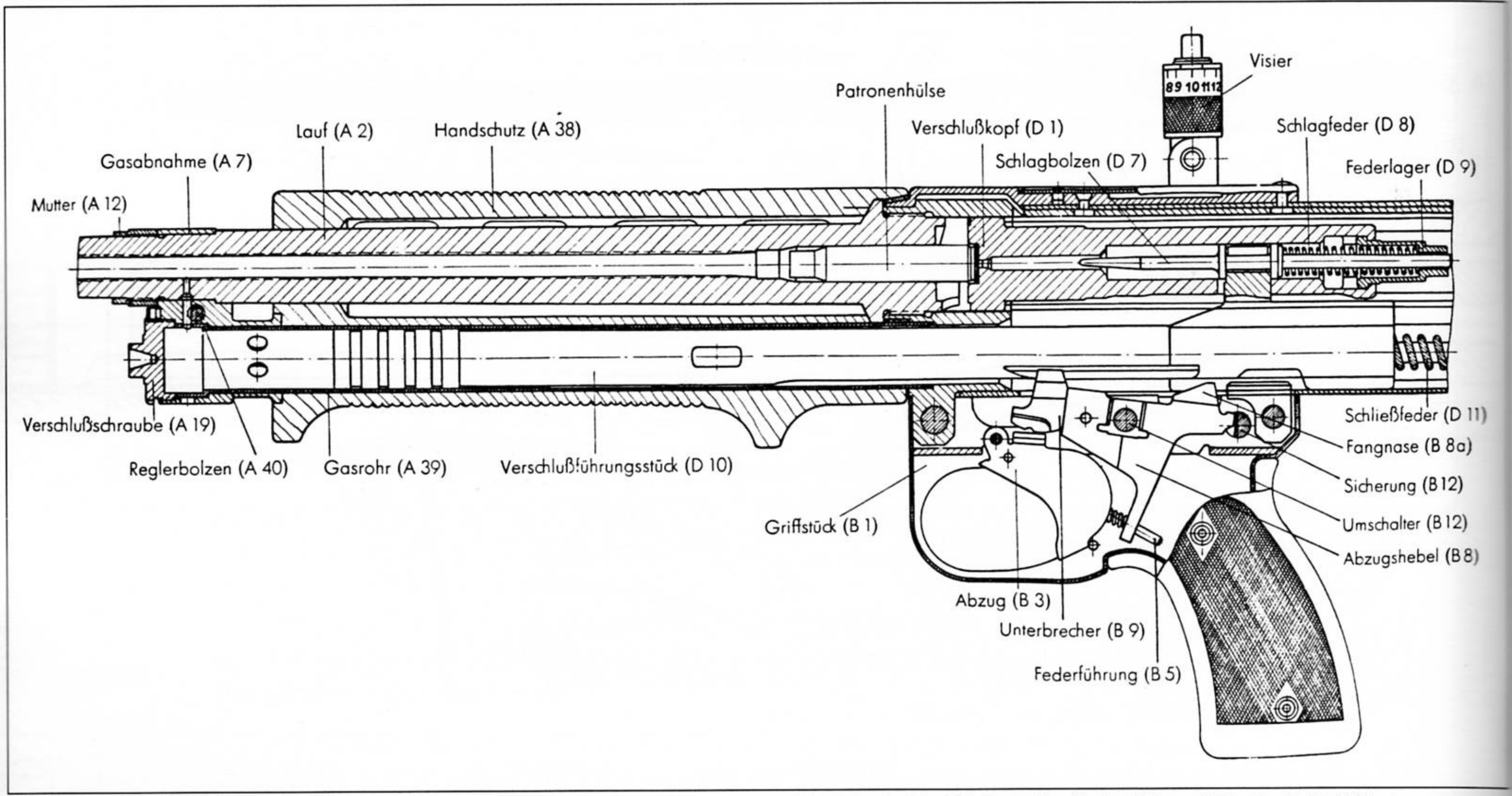
The gas piston (D10) with the bolt



91 (Above). Fig 24 from the final edition of D. (Luft) T.6194: top cutaway view of FG42 type 'G', feeding a cartridge from the magazine.

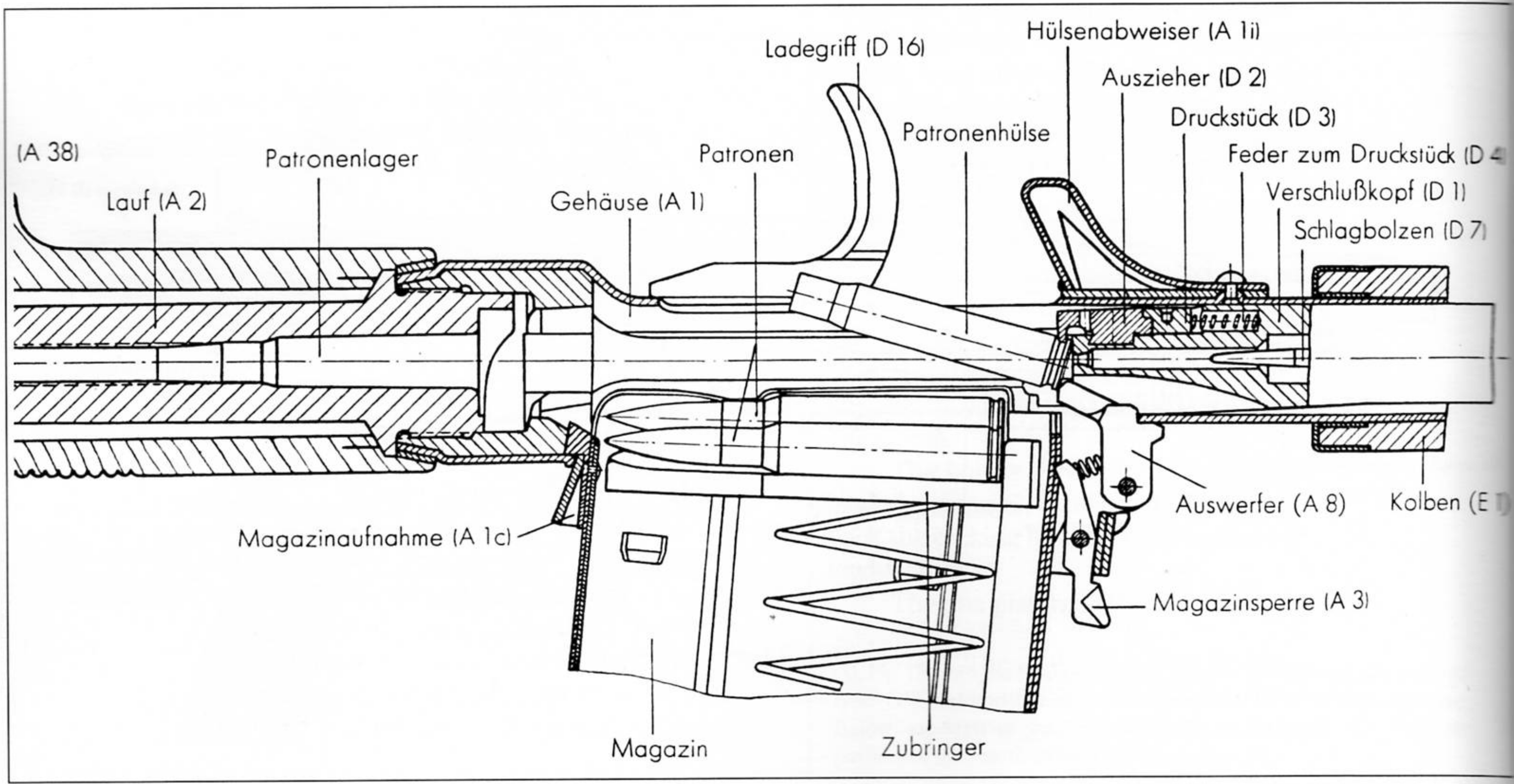
92 (Below). Fig 25 from the final edition of D. (Luft) T.6194: left side cutaway view of FG42 type 'G' action, loaded and cocked, with components set for single fire. The bolt head is locked and the firing pin (D7), carried by the yoke of the gas piston, is arrested 16mm from its fully-forward position by the sear (B8a) engaging in the single fire notch (D10c) of the gas piston.





93 (Above). Fig 26 from the final edition of D. (Luft) T.6194: left side cutaway view of FG42 type 'G' extracting a fired cartridge.

94 (Below). Fig 27 from the final edition of D. (Luft) T.6194: top cutaway view of FG42 type 'G', ejecting a fired cartridge. Compare with fig 40: in the type 'G' the ejector (A8), located in the receiver, pivots the cartridge case about the extractor (D2) and through the ejection port, where it is deflected by the fired case deflector (A1i).



head (D1) are moved by pulling the cocking handle to the rear, whereby the bolt head is turned by the yoke (D10g) of the gas piston moving through the cam slide (D1b). The locking lugs (D1a) in the bolt head are unlocked, the firing pin (D7) is withdrawn and the firing pin spring (D8) and the mainspring (D11) are compressed. As it returns to battery from its rearmost position, the bolt head in passing pushes the top cartridge from the magazine into the chamber of the barrel.

The locking lugs on the bolt head turn into the cams (A2c) in the rear of the barrel, locking the bolt head and sealing the cartridge in the breech; the extractor (D2) engaging the groove of the cartridge with its claw. The gas piston is arrested 16mm from the end of its forward travel by the sear engaging in its single fire recess (D10c).

When the trigger is pulled, its rear step pushes back on the lower edge (B9a) of the interruptor (B9), rotating the trigger lever on the axle of the fire selector, and depressing the sear. The gas piston is released and forced the final 16mm forward by the combined action of the mainspring (D11) and the firing pin spring (D8), and the tip of the firing pin is projected through the hole in the face of the bolt head to fire the chambered cartridge.

After the projectile has passed the gas port (A2d) in the barrel, gases flow into the chamber in the gas block (A7) and impinge on the front of the gas piston, driving it to the rear. The yoke (D10g) on the gas piston moves back through the straight cam slot (D1c) and into the curved cam slot (D1b) of the bolt head, turning the locking lugs (D1a) out of engagement with the barrel cams and unlocking the bolt. The firing pin is again withdrawn into its recess in the bolt head, and the mainspring and firing pin spring are compressed. The fired cartridge case is carried rearward by the extractor (D2).

As the fired case clears the chamber the ejector spring (A10) pushes the ejector (A8) into the ejector slot of the bolt head where it abuts the base of the fired cartridge, pivoting it about the extractor and throwing it through the ejection port on the right side of the weapon, where the fired case deflector (A1i) deflects the case downwards and to the front.

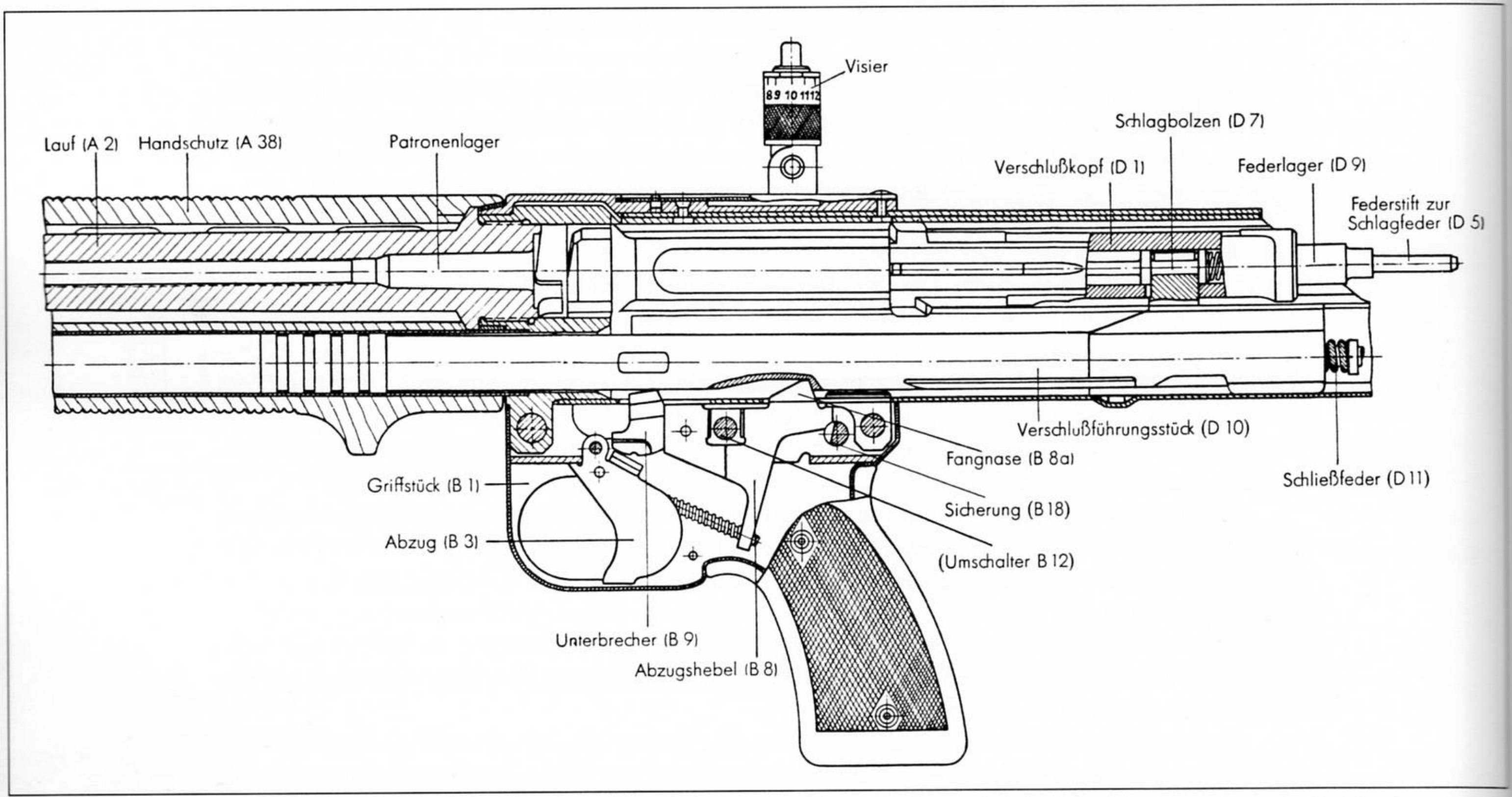
Meanwhile the upper edge (B9b) of the interruptor has reached the end of its free travel in the track (D10f) of the gas piston and is cammed to the left, disengaging its lower edge from the step in the trigger and freeing the trigger lever to move its sear up into the path of the single fire recess (D10c) of the gas piston. As the gas piston moves forward the sear engages with the single fire recess, and the upper edge of the interruptor again moves to the right in the track (D10f) of the the gas piston. However the trigger must be released before the next shot can be fired, as only by this action can the step in the trigger again engage the lower edge of the interruptor to effect a connection between the trigger and the sear of the trigger lever.

B. Automatic fire

The fire selector detent head (B16) is pulled outwards and the fire selector is turned to 'D' for automatic fire. In this position, the fire selector detent (B14) pushes on the rear of the trigger lever (B8), pivoting it to the right on the bearing (B12), and positioning the sear (B8a) in the path of the automatic fire recess (D10b) in the gas piston. At the same time, the interruptor (B9) on the front of the trigger lever is pivoted to the left, out of the path of the gas piston.

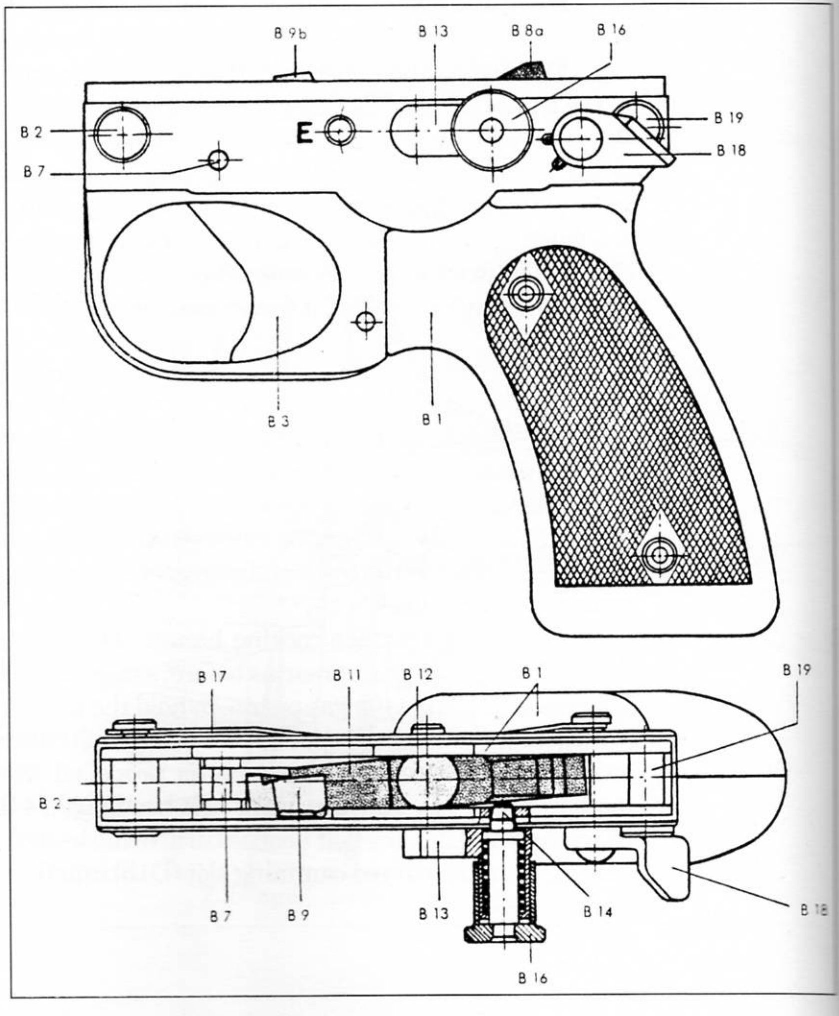
By pulling back the cocking handle (D16) the bolt head (D1) is unlocked and the bolt assembly is drawn to the rear as before, except that now the sear engages with the automatic fire recess (D10b) in the gas piston, to hold the bolt assembly in the rearward, cocked position.

When the trigger is pulled, the sear is withdrawn from the automatic fire recess in the gas piston, and the bolt assembly is propelled forward by the action of the compressed mainspring (D11). The face of the bolt head pushes the top cartridge from the magazine into the chamber (A2a), the bolt head is turned and locked by the action of the yoke of the gas piston moving from the curved camming slot (D1b) into the straight slot (D1c), and the final forward



95 (Above). Fig 28 from the final edition of D. (Luft) T.6194: left side cutaway view of FG42 type 'G' action, cocked. With components set for automatic fire, the bolt assembly is held in the rear position by the sear (B8a) engaging in the automatic fire recess (D10b) of the gas piston.

96 (Right). Fig 14 from the final edition of D. (Luft) T.6194: left side view of FG42 type 'G' pistol grip assembly with fire selector set at 'D' for full-automatic fire. Below: top view of handgrip assembly set for automatic fire. Compare with fig 90: note the repositioning of the sear (B8a) and the interruptor (B9).



movement of the gas piston carries the tip of the firing pin through the hole in the face of the bolt head to fire the chambered cartridge.

The unlocking of the bolt head and the rearward stroke of the action are effected as before, but in the automatic mode as long as the trigger is held back and ammunition remains in the magazine, the weapon will continue to fire. If the trigger is released, firing is interrupted by the sear rising into the path of the automatic fire recess (D10b) of the gas piston where it catches and holds the bolt assembly in the rearward, cocked position.

C. Method of operation of the bolt stop

When the magazine is emptied by either single or automatic fire, the nose at the rear of the magazine follower projects into the path of the bolt head and stops it.

On automatic fire, the cocking handle should be pulled to the rear before the empty magazine is removed. To resume firing, insert a loaded magazine. The weapon is now ready to fire.

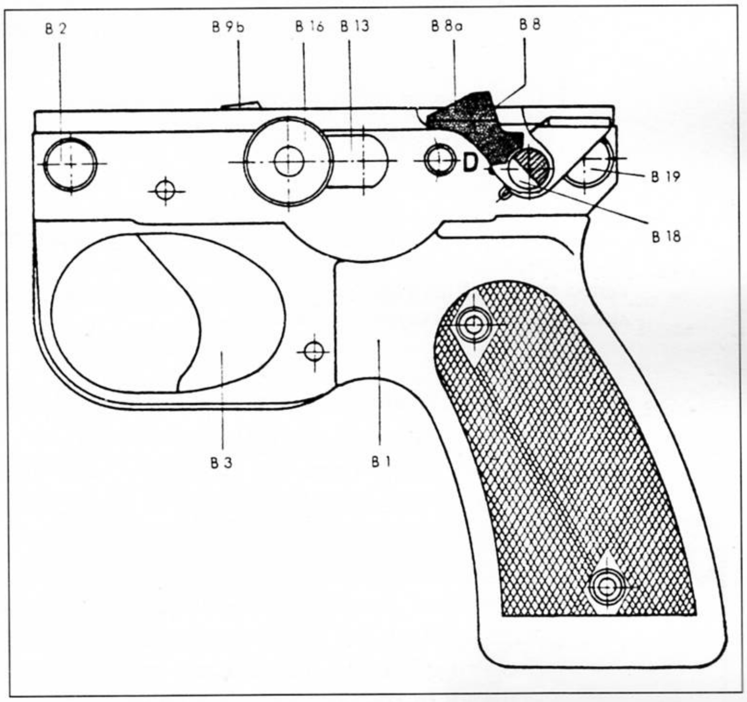
On single fire, removal of the empty magazine will allow the bolt to go forward. To resume firing, insert a loaded magazine, pull the cocking handle back, and let it go forward. The weapon is now ready to fire.

D. Method of operation of the recoil buffer and buttstock

In order to reduce the effects of recoil in firing, the weapon is mounted in the buttstock over the recoil buffer in a mobile manner. The damping of the recoil forces is effected by the buffer springs in the buffer housing.

E. Securing the weapon

The weapon can only be set on safe when it is cocked. This is done by rotating the safety lever (B18) in the pistol grip assembly to the position 'S'. In this position the rear end of the trigger lever is blocked by the solid portion of the safety lever shaft. When the safety lever is rotated to the firing position 'F', the rear end of the trigger lever is positioned over a slot in the safety lever shaft, where it has clearance to move downward when the trigger is pulled.



97. Fig 16 from the final edition of D. (Luft) T.6194: left side view of FG42 type 'G' pistol grip assembly with safety catch (B18) set at 'S' for safe. In this position the round portion of the safety catch shaft blocks the tail of the trigger lever (B8), preventing it from moving.

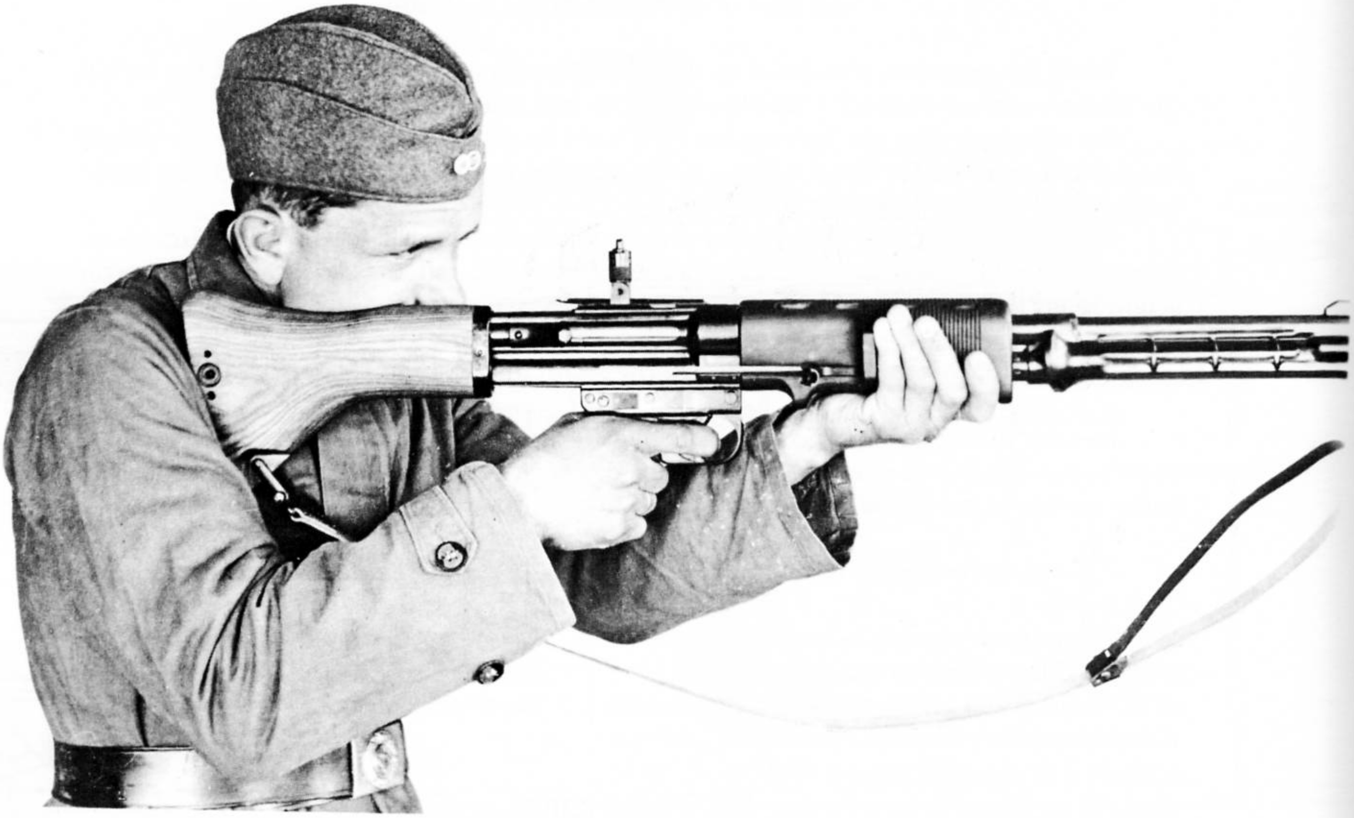
V. Employment

A. Preparation of the weapon for firing

The mechanism of the FG42 and especially the bolt is to be very carefully examined for proper functioning, and has to be well oiled with "Blue Gun Oil" (*Waffenöl Blau*). New guns should be well cleaned with rust preventative "Oil 39" and then lubricated with *Waffenöl Blau*. The weapon should be checked by being cocked and then uncocked carefully several times without the magazine being inserted, but never dry-fire the weapon. Then a loaded magazine, held in the left hand, is snapped into the magazine well nose forwards and then turned to the rear until the magazine catch engages. After setting for single or automatic fire, the weapon is cocked and loaded and put on safe.

B. During firing

The handling of the weapon is clearly shown in [various illustrations throughout this



98. An original German photograph of a soldier demonstrating the correct method of firing the type 'G' FG42 from the shoulder in the standing position. (Compare with fig 49).

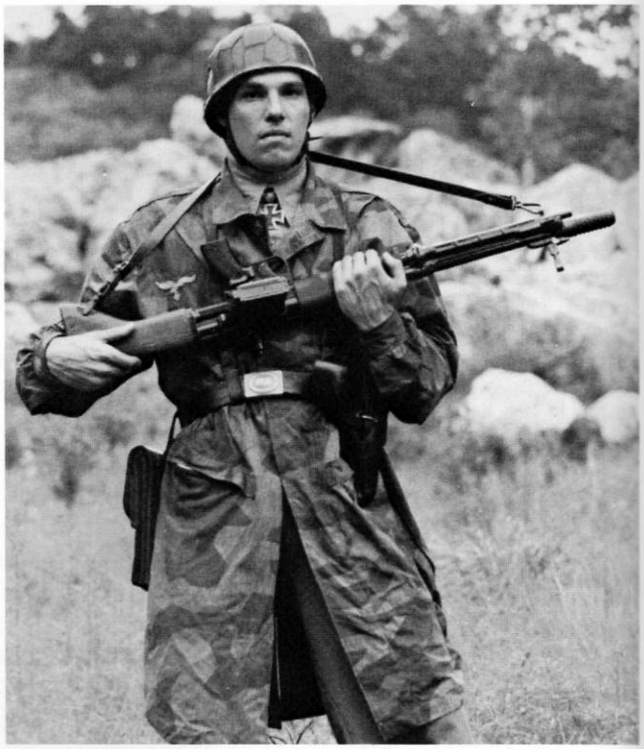
Courtesy George Petersen

book]. When firing, the firer's left hand grasps the handguard correctly (not on top) so as to avoid burns from the hot barrel, and also to control the weapon properly. In single fire, the trigger must be released after each shot. In single fire when the magazine is empty, removal of the magazine allows the bolt to go forward. A full magazine is inserted and the cocking handle pulled back before resuming firing. In the automatic fire mode, the weapon fires from the open bolt position, and continues to fire as long as the trigger is depressed and there are rounds in the magazine.

The gun can be fired with the bayonet attached.

C. After firing

Remove the magazine. Pull the bolt back and ensure that the chamber is clear, then pull the trigger and slowly let the bolt slide forward again.



99. A photograph taken during a combat reenactment scenario, illustrating the proper method of carrying the type 'G' FG42 during a parachute drop.

Courtesy Brad Mann

VI. Servicing

The FG42 must be well cared for, so that its components will function reliably and safely as long as possible. Check all parts frequently for wear or damage.

A. Cleaning

If the gun has not been fired, it need only be kept free of dust, dirt and dampness. Disassembly is not necessary for this, although the bore and chamber of the barrel and the bolt head must be kept clean and freshly oiled with *Waffenöl Blau*.

After every firing a major cleaning is needed, especially the bolt, buffer assembly and gas cylinder. (Section VII. Maintenance, below, shows how to disassemble the gun). The working parts have to be very carefully cleaned and oiled and inspected for cracks and breakages. Damaged parts must be replaced.

B. Reconditioning by Armourer artificer

If the gun does not function properly it must be sent to the Armourer artificer for inspection and repair. Using the criteria found in section II. Technical Data (above), the barrel and bolt are gauged and the mainspring and firing pin spring measured to determine their remaining service life. As far as possible, riveted parts should not be disassembled.

The parts that were not disassembled during major cleaning are also carefully checked by the Armourer artificer.

VII. Maintenance

The shooter is only permitted to perform those maintenance operations indicated by [bold text].

A. Disassembly and Assembly

1. Disassembly of the weapon into its main groups.

For disassembling take the weapon in the left hand with the muzzle pointing forwards!

a.) Remove the buttstock:

1. Press the takedown button on the buttstock with the thumb of the right hand and –

2. Pull the buttstock to the rear.

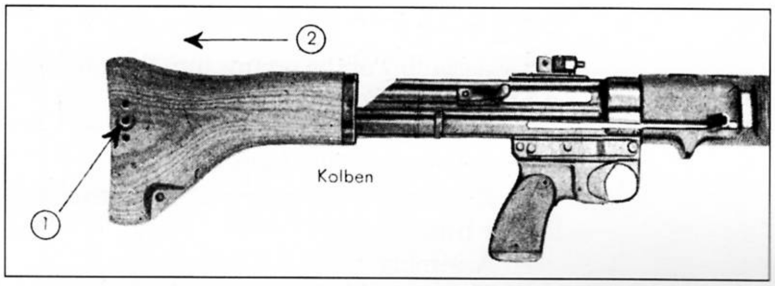
b.) Remove the buffer assembly:

1. Grasp the buffer assembly with the right hand, depress the front of the buffer lock spring with the thumb, and –

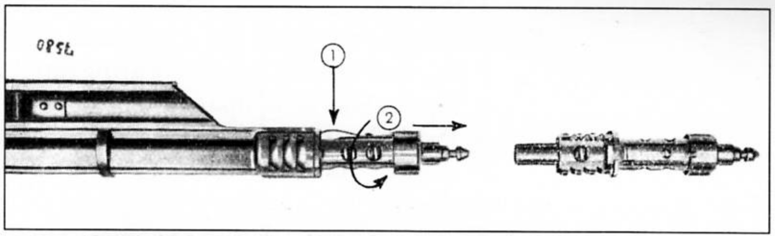
2. Turn the buffer assembly to the right or left until it can be removed to the rear.

c.) Remove the bolt assembly:

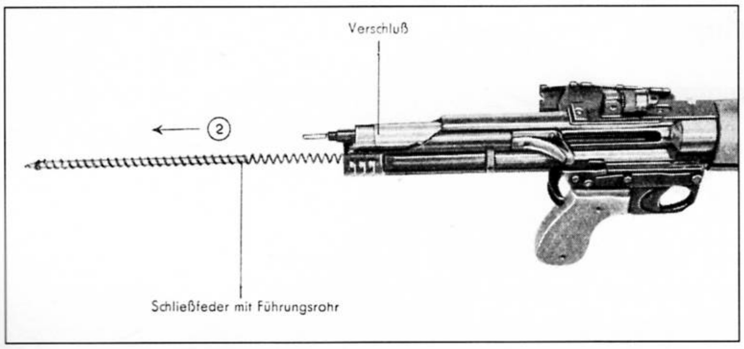
1. Pull the cocking handle back to



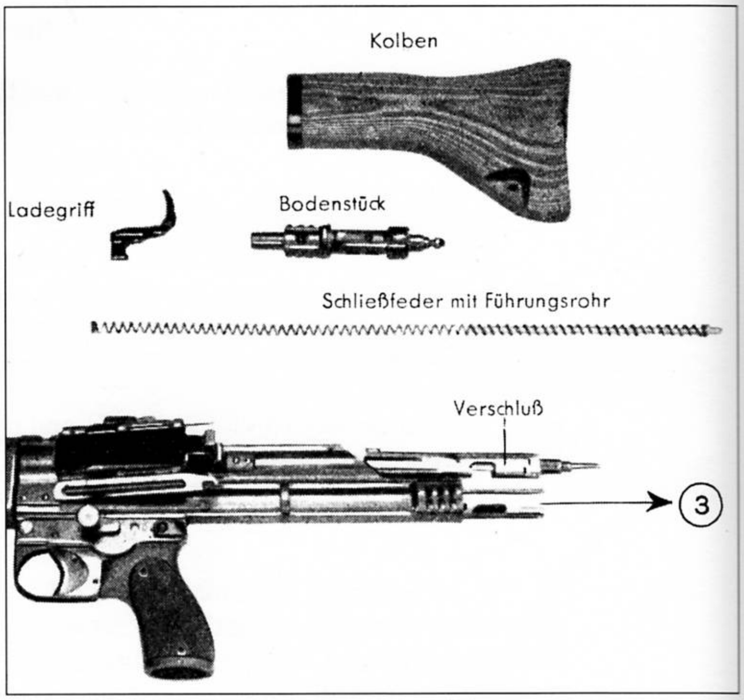
100. Fig 37 from the final edition of D. (Luft) T.6194, showing removal of the buttstock of the type 'G' FG42.



101. Fig 38 from the final edition of D. (Luft) T.6194, showing removal of the buffer assembly of the type 'G' FG42.



102. Fig 39 from the final edition of D. (Luft) T.6194, showing initial removal of the mainspring and bolt assembly of the type 'G' FG42.



103 (Right). Fig 40 from the final edition of D. (Luft) T.6194, showing further removal of the bolt assembly of the type 'G' FG42.

the end of its slot.

2. Pull out the mainspring guide and mainspring with its button.
3. Remove the cocking handle to the right.
4. Grasp the bolt head and pull the bolt assembly out to the rear, then uncock the bolt head by turning it toward the right. Carefully release the tension in the firing pin spring.

d.) Remove the pistol grip:

1. Remove the pin retaining plate.
2. Remove the front retaining pin.
3. Remove the safety lever and the rear retaining pin.
4. Remove the pistol grip assembly.

2. Disassembly of the groups into their individual parts.

a.) Buffer assembly

Disassembly

1. Unscrew the lock nut.
2. Remove the rear buffer bushing, the two buffer springs and the front buffer bushing.

Assembly

The assembly is effected in reverse order.

b.) Bolt

Disassembly

1. Press the firing pin spring retainer forward and remove after a quarter turn.
2. Remove the firing pin spring and guide.
3. Remove the bolt head and firing pin upwards from the gas piston.
4. Tip the bolt head up to let the firing pin slide out.
5. Press the indent on the extractor keeper to the rear with the point of a cartridge and remove the extractor, keeper and spring.

Assembly

The assembly is effected in reverse order, however it should be noted:

Position the firing pin in the bolt head so that it can be seen through the cam slot. Place

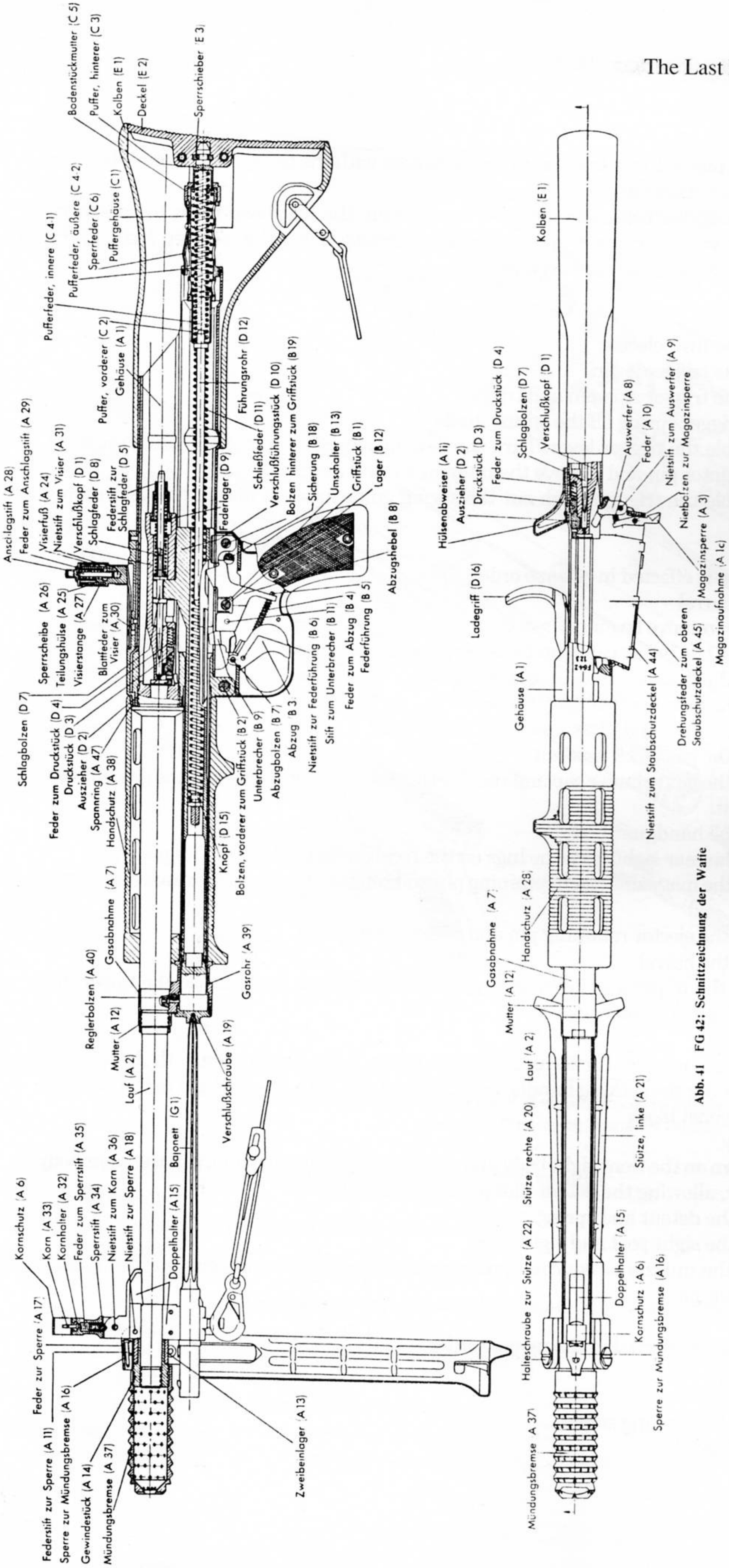


Abb. 41 FG 42: Schnittzeichnung der Waffe

104. Fig 41 from the final edition of D. (Luft) T.6194, showing full sectional drawings of the type 'G' FG42, left side and top views. Note (above) the weapon is depicted fitted with a seldom-seen variant buttstock made of moulded plastic.

the yoke of the gas piston through the cam slot to engage with the firing pin. Then replace the firing pin spring and other parts.

Before inserting the bolt assembly into the weapon, the bolt head must be cocked by pushing it forward while turning it to the left, then inserting it into the receiver. Note: in the cocked position the locking lugs are vertical!

c.) Pistol grip

Disassembly

1. Remove the fire selector.
2. Remove the trigger lever.
3. Remove the trigger axis pin and trigger.
4. Pull the trigger spring off the spring guide.
5. Disassemble the trigger lever: Turn the bearing a quarter turn and lift off; push out the interruptor pin and remove the interruptor and its spring.
6. Disassemble the trigger: Push out the spring guide axis pin and remove the spring guide.

Assembly

The assembly is effected in reverse order.

d.) Receiver with barrel

Disassembly (remove bayonet first) then:

1. Lift the muzzle brake catch and unscrew the muzzle brake.
2. Unscrew the muzzle brake mounting sleeve.
3. Remove the bipod assembly to the front.
4. Remove the front sight/bayonet block to the front.
5. Unscrew the gas block lock nut.
6. Unscrew the gas cylinder cap and remove the gas block together with the gas cylinder to the front.
7. Remove the handguard.
8. Remove the rear sight from the lugs on the receiver by pushing out its pivot pin.
9. Push out the magazine catch retaining pin and remove the magazine catch and ejector spring.
10. Push out the ejector retaining pin and remove the ejector.
11. Unscrew the barrel.
12. Push out the upper and lower dust cover retaining pins and remove the upper and lower springs and their covers.

Assembly

Assembly of the receiver is effected in reverse order. Take care to align both the long slot in the gas cylinder (for the cocking handle) and the short slot with the rivet pin in the receiver.

e.) Front sight/bayonet block

Disassembly

1. Press down on the front sight body and push out the sight pivot pin. Lift the sight body gradually, allowing the detent plunger spring to expand.
2. Remove the detent and spring.
3. Remove the sight post and sight hood.
4. Remove the muzzle brake catch, plunger and spring after pushing out the muzzle brake catch pin.

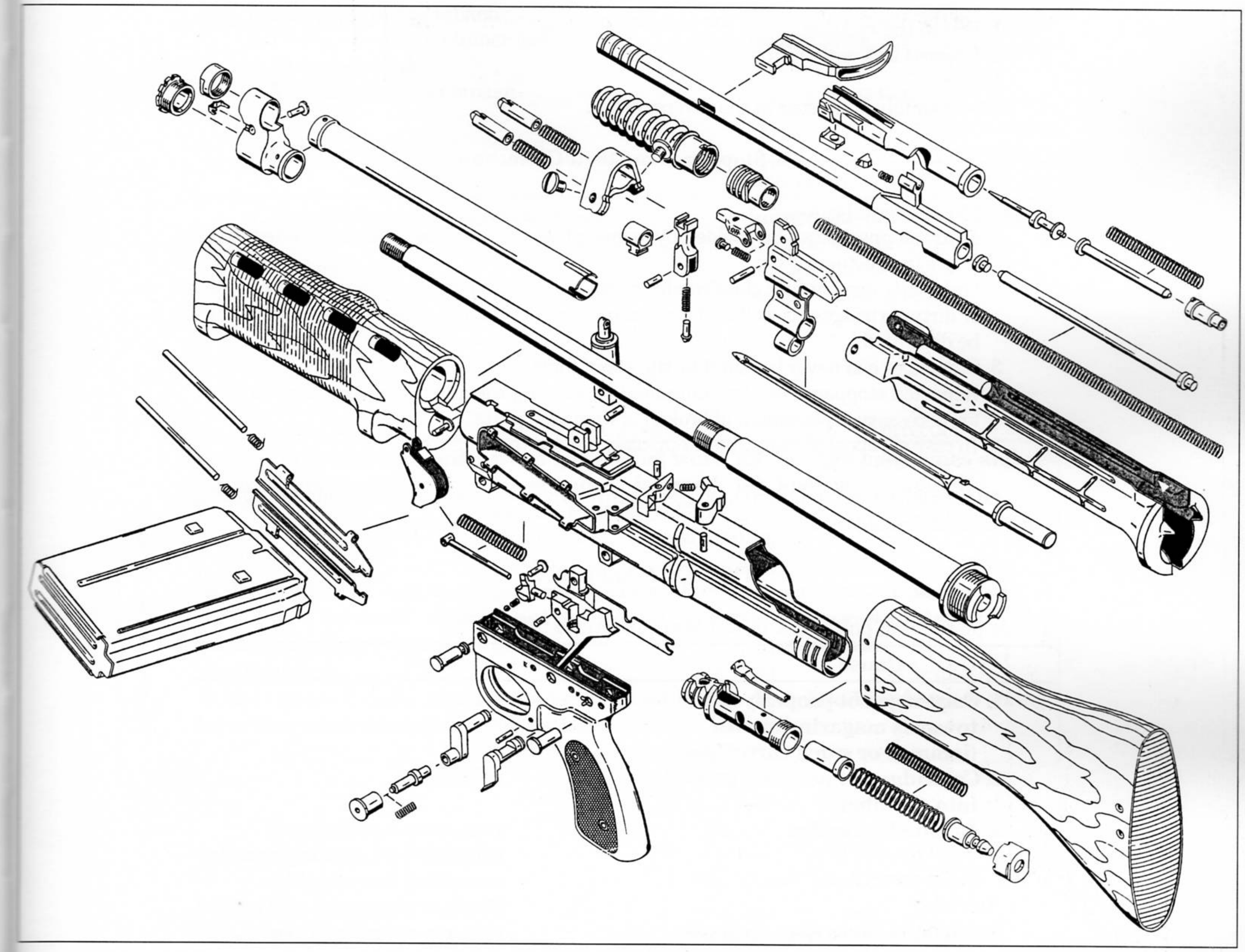
Assembly

The assembly is effected in the reverse order.

f.) Bipod

Disassembly

1. Unscrew the holding screws.
2. Remove the legs.



105. A left-side exploded isometric view of all the components of the type 'G' FG42. Drawing by Thomas B Dugelby

3. Remove the spring housings with rollers and springs.

Assembly

The assembly is effected in the reverse order.

g.) Rear sight

Disassembly

1. Press the sight post down, and remove the locking clip. Remove the knurled elevation ring.
2. Remove the sight post with its spring and guide.

Assembly

The assembly is effected in the reverse order.

h.) Bayonet

Disassembly

1. Pry off the end disc.
2. Depress lock with spring and pull out.

Assembly

The assembly is effected in the reverse order.

B. Stoppages and their Correction

Notice of fundamental causes:

1. Many stoppages can be avoided by keeping the weapon clean and maintained to the above instructions.
2. Only cartridges in first class condition are to be loaded into the magazine. Deformed or dirty cartridges, as well as damaged rounds with dented cases or loose bullets must be discarded.
3. Stoppages can never be cured by the use of force.
4. Repeated stoppages can be eliminated by sending the gun to the Armourer artificer for necessary replacement of broken or damaged parts.
5. In case of repeated magazine stoppages, replace the magazine.

Additional notice! Common stoppages which can be corrected during the course of fighting are indicated [in bold type].

TYPE OF MALFUNCTION

a. Gas piston and bolt stuck in rearward position:

Cause	Correction
1. Cartridge not properly fed towards magazine mouth (jammed or stuck cartridge)	**reload**
2. Cartridge not properly guided into chamber	**reload**
3. Jammed cartridge	**remove magazine; pull rearward on cocking handle, removing the cartridge. Replace magazine and reload.**
4. Cartridge case not extracted, caused by extractor slipping off case rim, or	**remove cartridge case**
5. Extractor broken, or	replace extractor
6. Ejector damaged; extractor spring weak or broken	replace ejector or extractor

b. Failure to fire:

Cause	Correction
1. Faulty primer	**reload**
2. Primer not struck with sufficient force (dirt in bolt head)	**clean bolt**
3. Cartridge not fed; follower spring not strong enough (magazine out of position)	**change magazine**
4. Firing pin broken	replace firing pin

5. Firing pin spring broken	replace firing pin spring
6. Firing pin spring retainer lost (firing pin slack)	replace firing pin retainer
7. Yoke on gas piston broken	replace gas piston

c. Bolt stuck in forward position:

Cause	Correction
1. Very dirty or damaged chamber	**immediate action, noting that cartridge is ejected**
2. Broken bolt parts	replace with new parts
3. Buffer spring too weak or broken (excessively hard recoil)	replace buffer springs

d. Stoppages of bolt stop, trigger and magazine:

Malfunction	Cause	Correction
1. Bolt does not stay open after magazine is empty	**worn gas piston, worn follower nose, jammed follower,** rivetted joint in gas piston loose, or mainspring broken	**change magazines and reload;** new gas piston
2. In single fire bolt does not move forward from cocked position when trigger is pulled	**interruptor is broken and is not positioned over trigger**	**set on full automatic — weapon will fire only full automatic!**
3. The weapon 'doubles' or provides unwanted automatic fire	fire selector detent broken or fire selector detent spring weak	replace fire selector or spring

Part 2

M20-42

20 Shot Magazine 42

I. Employment and characteristics

The cartridge feed is effected in the FG42 by means of the 20-round magazine (M20–42). It is a 'flat' magazine which can be loaded by hand with all types of ammunition used in the K98k. The magazine is snapped into the magazine well of the FG42.

II. Technical data

Dimensions:	
Magazine M20–42	30 x 90 x 155mm
Weight:	
Magazine M20–42 empty:	0.380kg [.8 lb]
M20–42 loaded:	0.908kg [2.0 lb]

III. Description

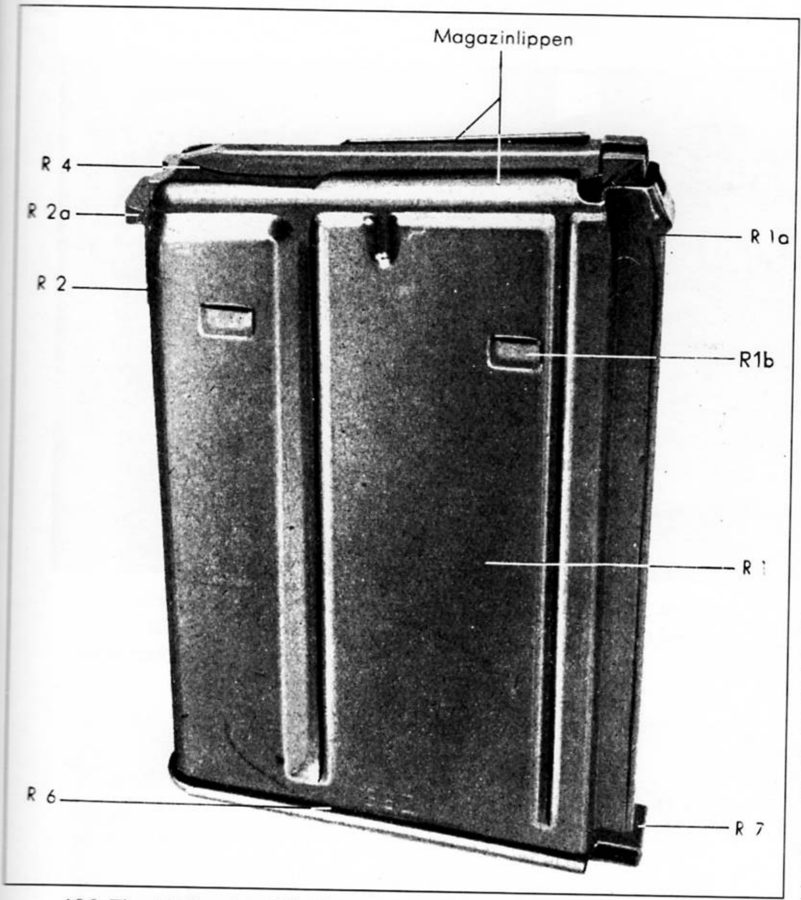
The magazine M20–42 consists of:

magazine housing	R1
magazine locking lug, front	R2
spring steel strip	R3
magazine follower	R4
follower spring	R5
floorplate	R6
floorplate disassembly spring	R7

The magazine housing (R1) is a flat hollow body whose lateral walls are rounded at the top end (feed lips) to support and guide the cartridges. The nose (R2a) of the front locking lug (R2) engages a recess in the receiver (A1), and the notch (R1a) receives the magazine catch (A3). In each of the outer faces there are two raised stops (R1b) which butt against the magazine housing. To protect the magazine from the points of the loaded cartridges, a spring steel strip (R3) is rivetted to the forward inside surface. On the base of the magazine housing is the floorplate (R6), which supports the follower spring (R5), at whose top end is the magazine follower (R4) together with its nose (R4a) for holding the bolt open when the magazine is empty. The magazine floorplate slides onto grooves in both sides of the magazine housing, and is retained by the disassembly spring (R7).

IV. Method of operation

The magazine is loaded by hand, whereby cartridges are pressed down individually onto the follower, and the follower spring is compressed. Because of the stepped surface of the follower the cartridges position themselves side by side in a zig-zag manner for optimum space utilisation. For firing, the nose (R2a) is snapped into the front of the magazine well (A1c) and the magazine is pressed to the rear until the rear notch (R1a) engages with the magazine catch



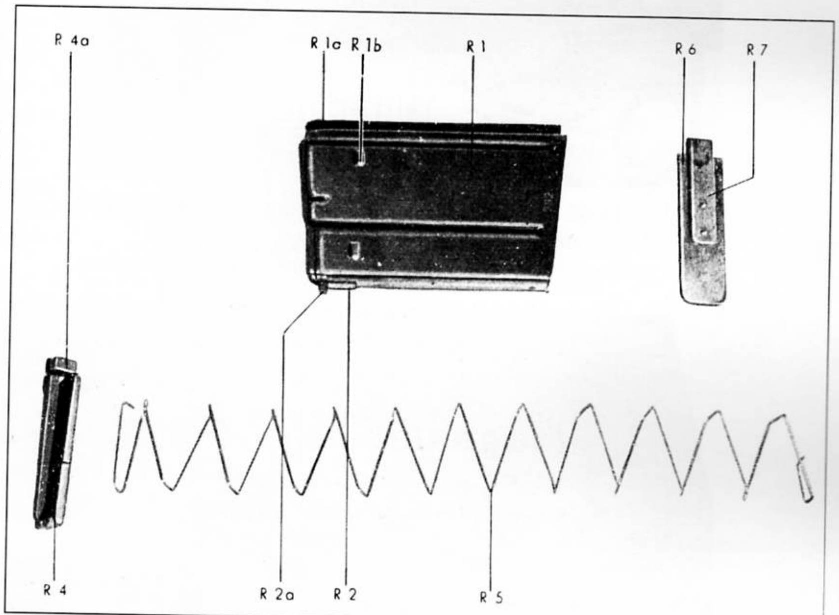
106. Figs 1 (above) and 2 (right, below) from section 2 of the final edition of D.(Luft) T.6194, showing the M20-42 magazine for the type 'G' FG42, with its components labelled to correspond with the accompanying text.

of the weapon. The follower spring ensures that the top cartridge is provided on the feed lips of the magazine ready for feeding. The bolt head, moving forward under pressure from the recoil spring, strips the leading cartridge into the chamber of the barrel. When the last cartridge is fed and the magazine is empty, the nose (R4a) of the follower projects into the bolt path and halts the bolt travel. In single fire, the bolt will run forward when the empty magazine is removed.

V. Employment

For attachment to the weapon, the magazine is held in the left hand – the points of the cartridges forward – and inserted until the nose of the front locking lug snaps into the recess in the front of the magazine well, then pressed to the rear until the magazine catch engages.

To remove the magazine grasp it with the left hand, press the magazine catch forward with the left thumb, and remove the magazine with a slight forward movement.



VI. Servicing

The magazine is to be kept clean. Foreign matter on the inside must be removed. Examine the magazine carefully to ensure that it is not dented, and the feed lips are not bent out of shape or rusty.

VII. Maintenance

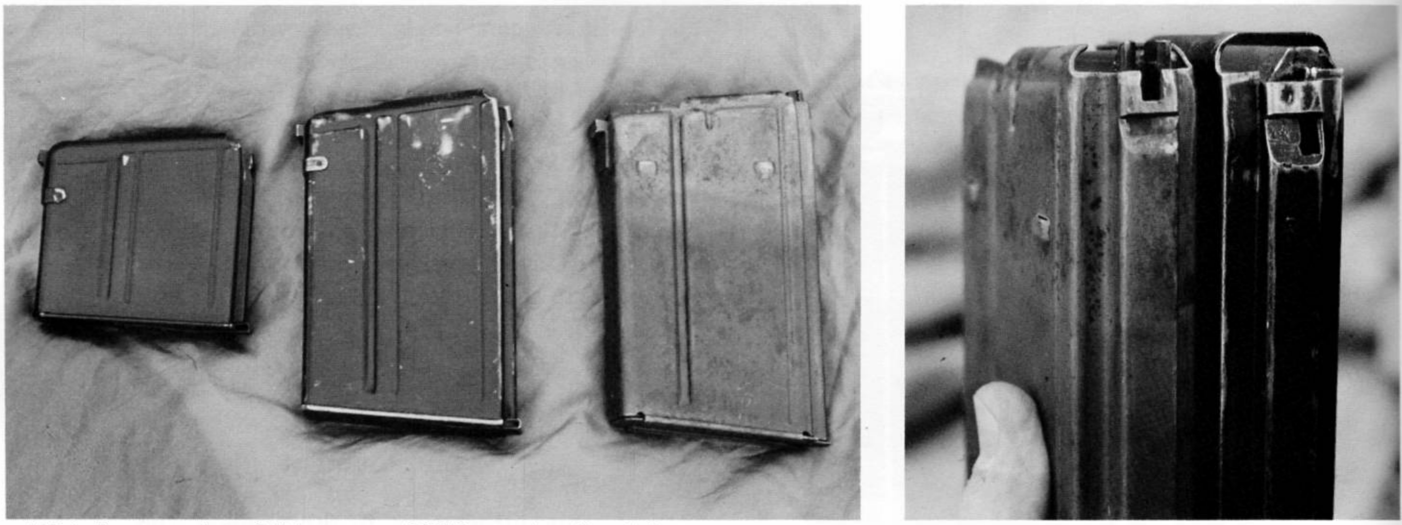
a. Disassembly and Assembly

1. Pull up the disassembly spring on the floorplate.
2. Slide the floorplate forward and remove.
3. Remove the follower spring and follower from the magazine housing.

b. Stoppages and their correction

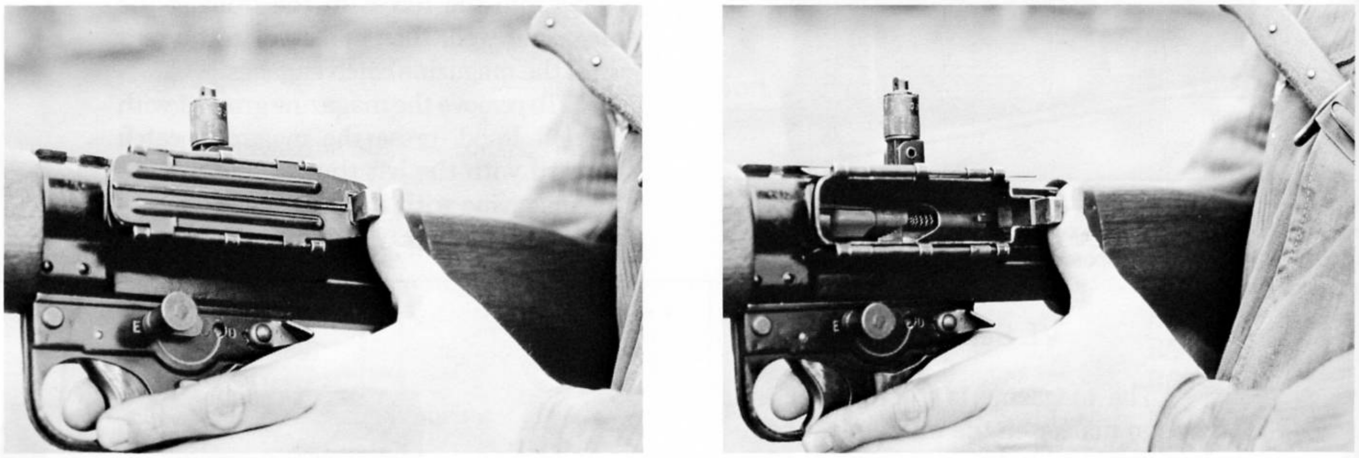
Stoppages due to dirt in the magazine will be avoided by repeated cleaning, which will keep the magazine serviceable.

The firer is forbidden to attempt to correct bends, dents or other damage to the magazine.

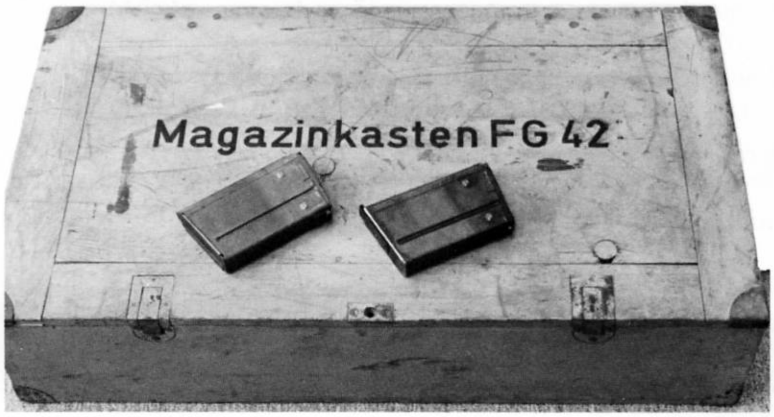


107. Left: a comparison of all three types of FG42 magazines. From left: M10-42 10-shot magazine (type 'E' FG42); M20-42 20-shot magazine (type 'E' FG42); M20-42 20-shot magazine (type 'G' FG42).

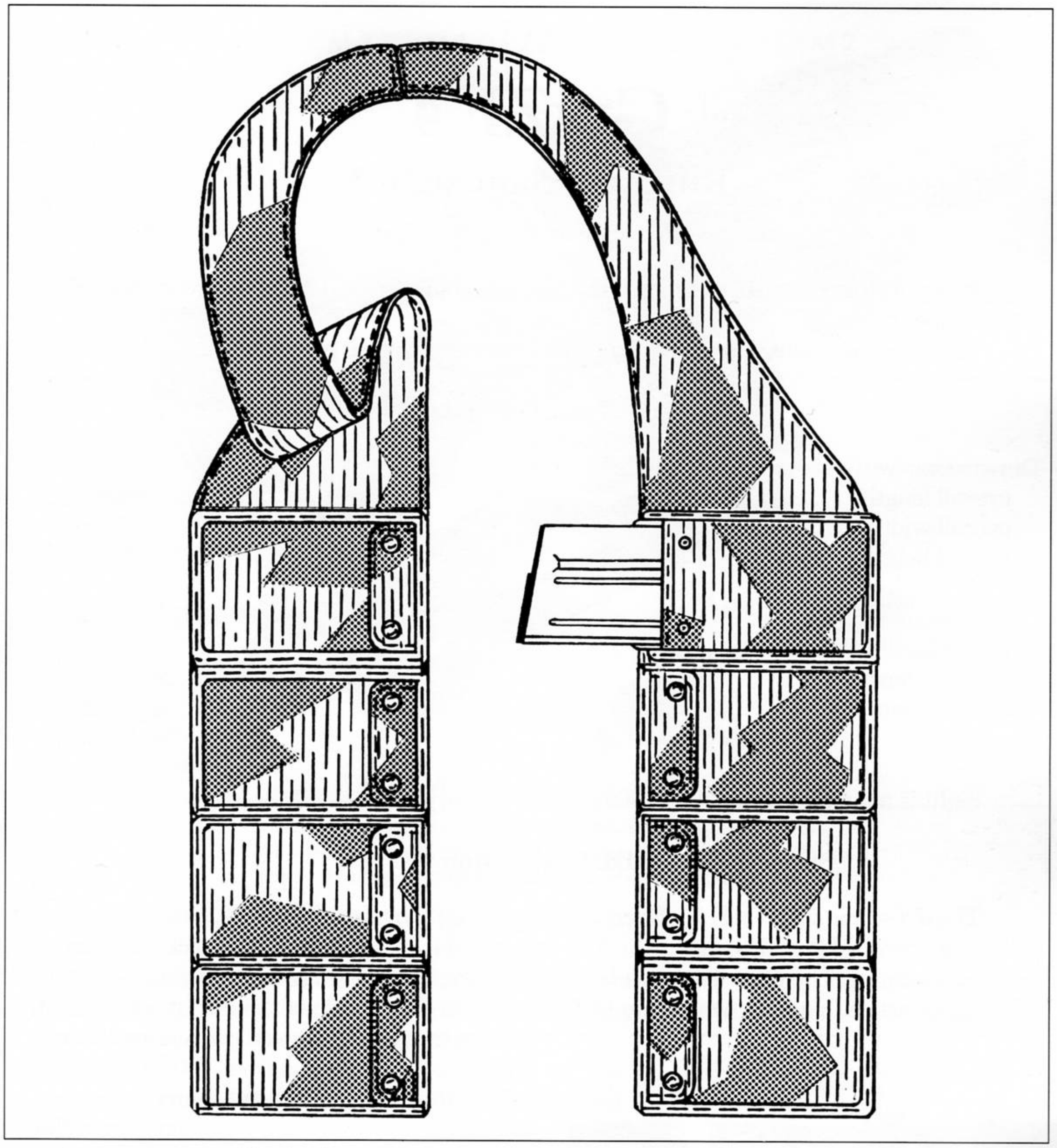
Right: a comparison photograph of the rear locking notch area of two FG42 magazines. left: late M20-42 (type 'G'); right: early M20-42 (type 'E'). Photos by Robert Bruce



108. Left: FG42 type 'G' magazine well dust covers closed; operator about to apply initial pressure to magazine catch.
Right: pressure on magazine catch has freed dust covers to spring open and lie flat against top and bottom of magazine housing.
Photos by Robert Bruce



109. A very rare FG42 "accessory" indeed – an original FG42 magazine chest or *magazinkasten FG42* for the type 'G' FG42. Its owner advises that contributions of the 'guesstimated' 48 magazines required to fill it up will be most welcome. George Petersen collection



110. Another rare accessory – the camouflage-pattern FG42 gunner's shoulder-harness bandolier, which held eight M20-42 magazines.
Drawing by Thomas B Dugelby

Part 3

GwZF 4

Rifle telescopic sight 4

I. Purpose and description

By mounting it over the rear sight, the rifle telescopic sight 4, GwZF 4 converts the FG42 into a sniper rifle.

The telescopic sight has 4-power magnification and normal point of aim.

II. Technical data

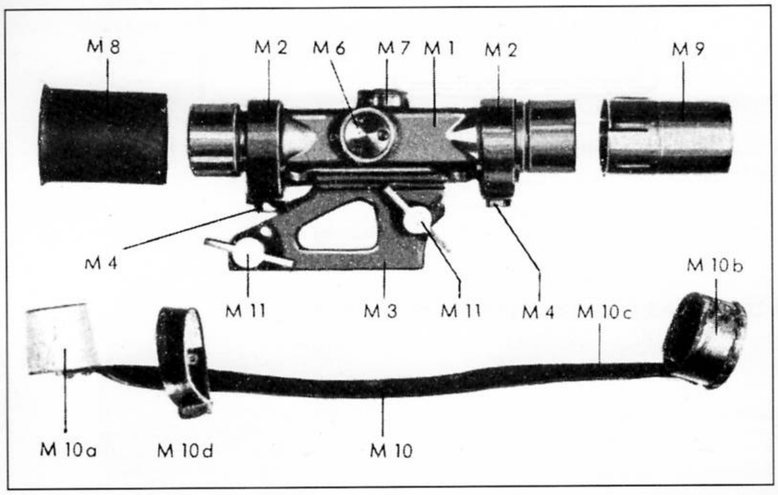
Dimensions (without rain covers and lens guard):

overall length	190mm
overall width	45mm
overall height	70mm
weight complete	0.575kg [1.26 lbs]
magnification	4x
eyepiece lens	24mm dia
objective lens	6mm dia
eye relief	76 - 80mm

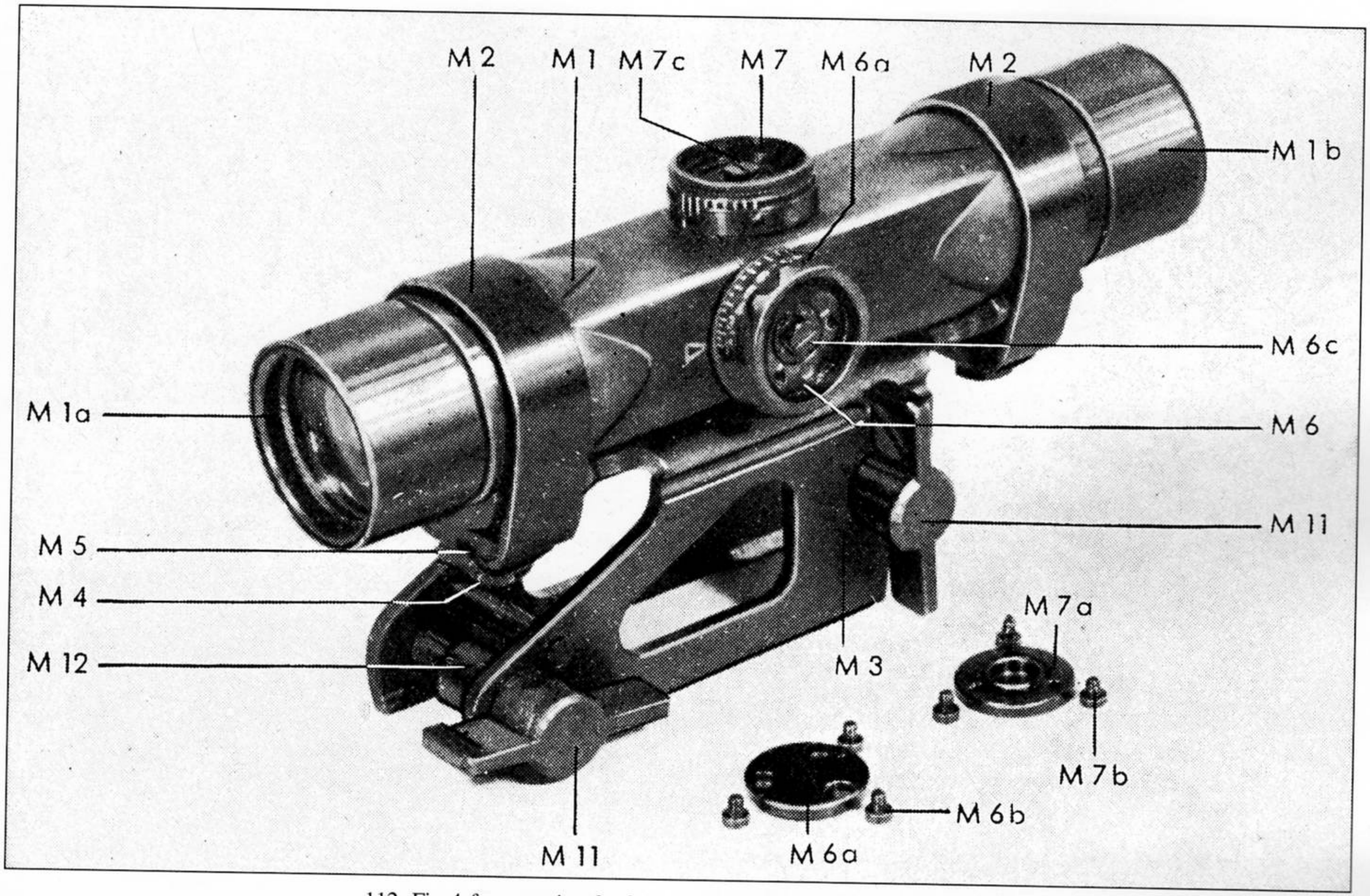
Sight is adjustable from 100 to 800m

III. Description

The telescopic sight (M1) is affixed to its mount (M3) by two rings (M2), each secured by a locking screw (M4) and wedge (M5). The screws (M4) are equipped with lock washers to prevent loosening. The telescope has a height adjustment drum (M6) on the right side, and a windage or azimuth adjustment drum (M7) on top. On the outside of the height adjustment drum there are engraved graduations from 1 to 8, denoting ranges from 100 to 800m (in 50m divisions). To prevent injury to the eye, a rubber eye guard (M8) is slipped over the eye piece (M1a). Over the exit (objective) lens (M1b) a rain guard (M9) may be slipped. The eyepiece and objective lens are protected from dirt by a lens guard (M10), consisting of a wooden plug (M10a) and cap (M10b) tied together with a leather loop (M1d). The female dovetail on the base of the mount (M3) is slipped onto the corresponding male dovetail on the rear sight plate of an FG42 and locked at the rear by turning the half-round bolt (M12) into the recess in the sight plate by means of the rear clamp (M11). The front clamp is then tightened, clamping the complete ZF securely on the receiver dovetail.



111. Fig 3 from section 3 of the final edition of D. (Luft) T.6194, showing the main components of the Voigtländer GwZF4 telescopic sight, in a "swallow-tail" mount.



112. Fig 4 from section 3 of the final edition of D. (Luft) T.6194, showing the Voigtländer GwZF4 telescopic sight with cover plates removed from the windage and elevation adjustment drums.

IV. Method of operation

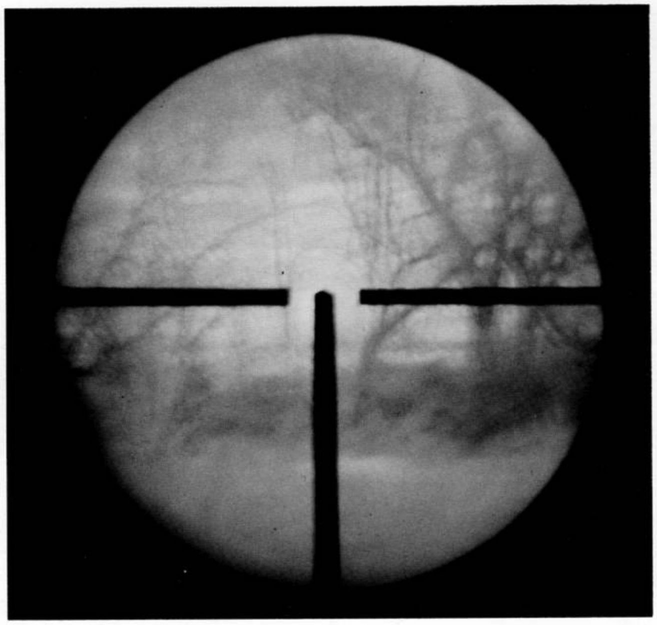
The light that comes in through the objective lens passes through the inverting lens, through the eyepiece, and into the soldier's eye. The height and windage of the reticule can be altered by means of the adjusting drums.

V. Adjustment

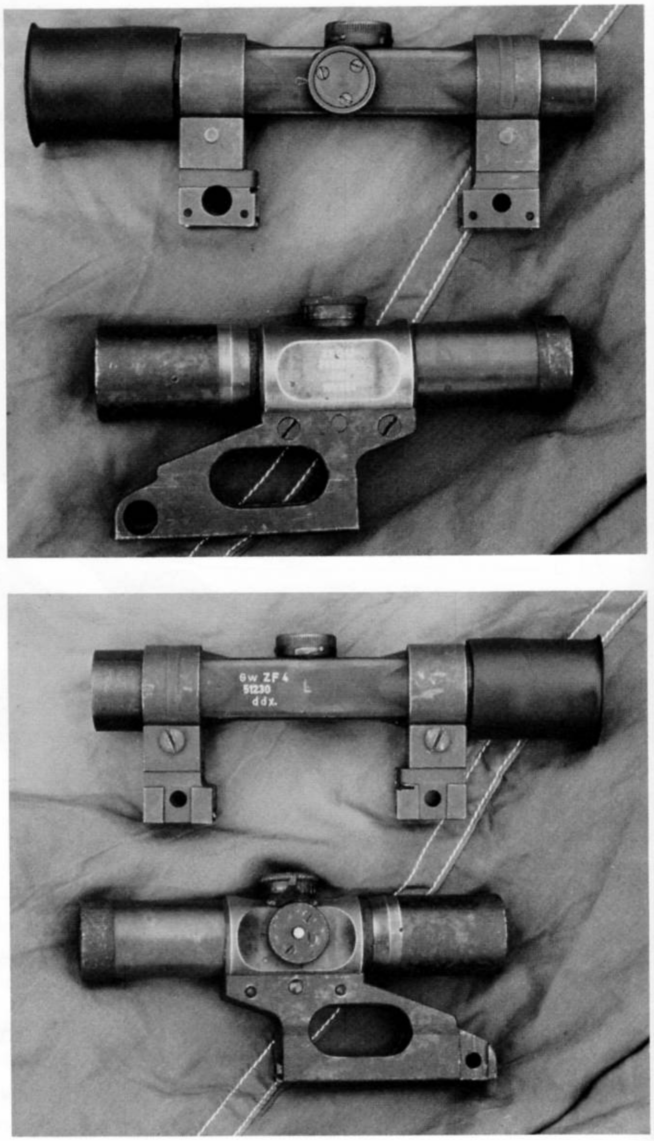
A. To adjust the ZF, set the elevation adjustment drum to 1 (100m), slip the unit onto the sight plate of an FG42 aimed at a target at 100m range, and tighten the clamps (M11) by hand. Remove the protective cap from the windage adjustment. Remove the holding screws (M6b and M7b) of the cover plates for the windage (M7a) and elevation (M6a) adjustment drums. When the cover plates are removed the adjustment screws (M6c and M7c) can be seen. By turning these screws either to the left or right the target can be centred. On the sighting-in target disc or plate a 10cm-high triangle is marked at the bottom. With the triangle appearing right side up, single shots are fired, the hit on the target checked, and corrections made until the sight is adjusted perfectly so that the triangle at the tip of the reticule post matches that of the target. After adjustments are completed the cover plates and the windage guard cap are replaced.

B. In battle, the range will be controlled by the adjusting drum.

C. The coloured filter is used to provide protection from the sun. To install, remove the rubber eye guard (M8), screw the filter in, and replace the eye guard over the eyepiece (M1a).



113. The reticle pattern of the GwZF4 telescopic sight for the type 'G' FG42. Photo by Robert Bruce



114. Right and left side comparison views of two FG42 telescopic sights.
Above, right: the GwZF4 (for the type 'G') with its rubber eye guard, in a 'two-ring' mount. The front and rear clamps are missing from the mount.
Below, right: the ZFG42 (for the type 'E'). Photos by Robert Bruce

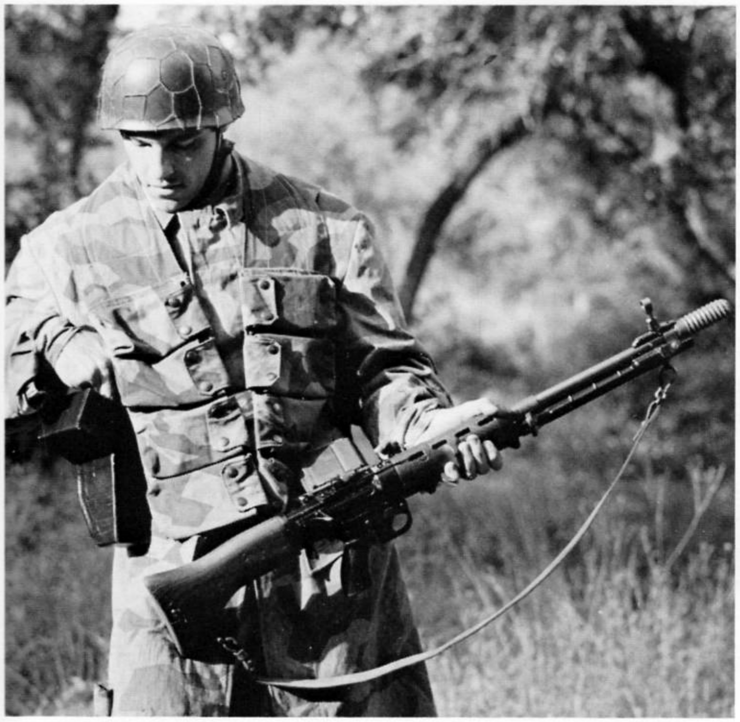
A clear filter, which mounts the same way, is provided for protecting the lens. Leaving the coloured or clear filter installed will protect the lens from moisture.

VI. Servicing

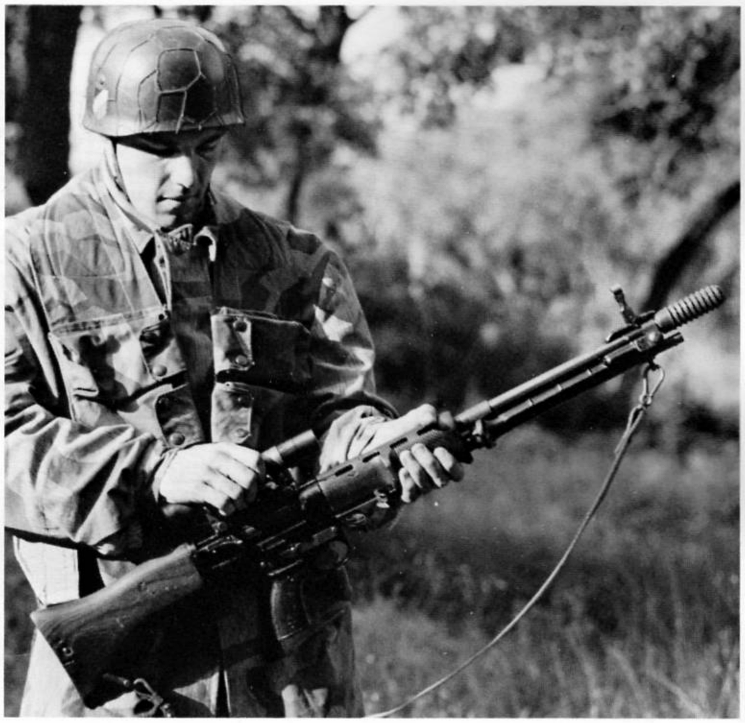
The eyepiece and the objective lens will be cleaned only with the woollen cloth found in the cover of the carrying case.

VII.Storage

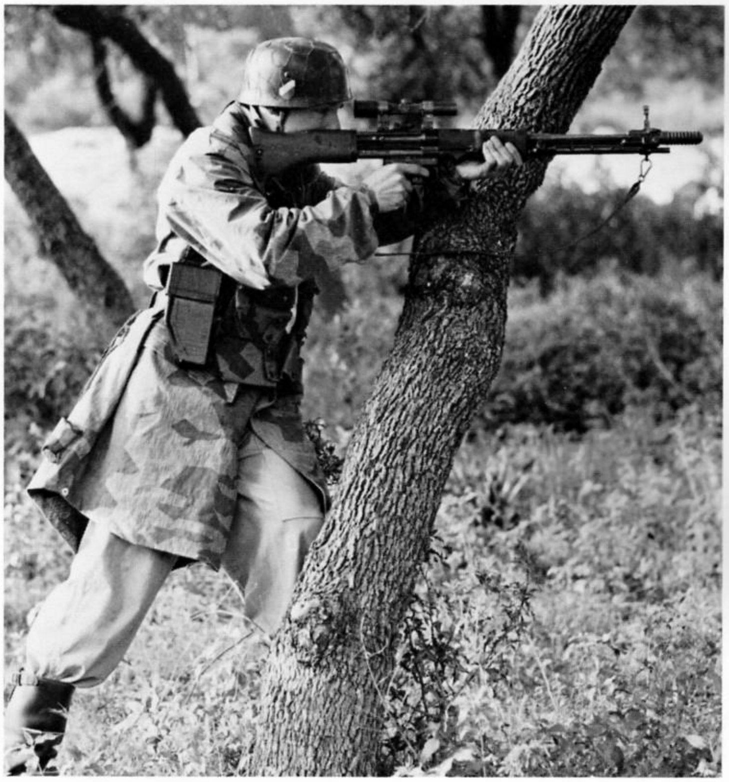
The telescopic sight is kept in the carrying case. The case has a side pocket for the rain guard (M9), and spaces in the lid (cover) for the clear and coloured filters and the cleaning cloth.



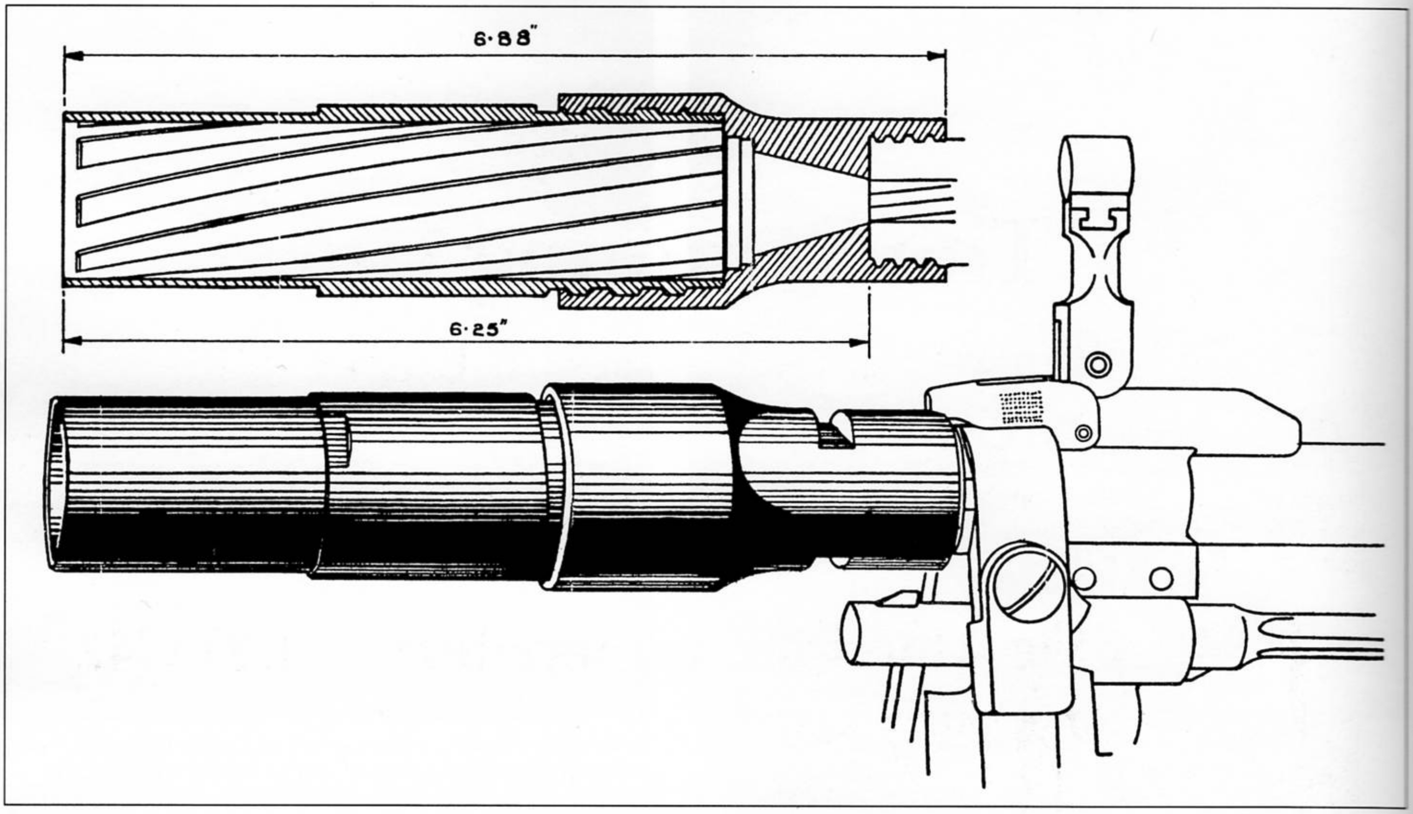
115. Attachment of the telescopic sight no 1: gunner removes scope from carrying case mounted on waist belt.
Photo courtesy Brad Mann



116. Attachment of the telescopic sight no 2: gunner fits scope mount onto rails atop weapon's receiver, over the (folded) rear iron sight.
Photo courtesy Brad Mann



117. Sighting the type 'G' FG42 through the GwZF4 telescope.
Photo courtesy Brad Mann



118. The type 2 grenade launcher, shown fitted on a type 'G' FG42. Inset, above: dimensioned section drawing of the FG42 type 2 grenade launcher, showing construction details, mounting threads and rifling.
Drawings by Thomas B Dugelby

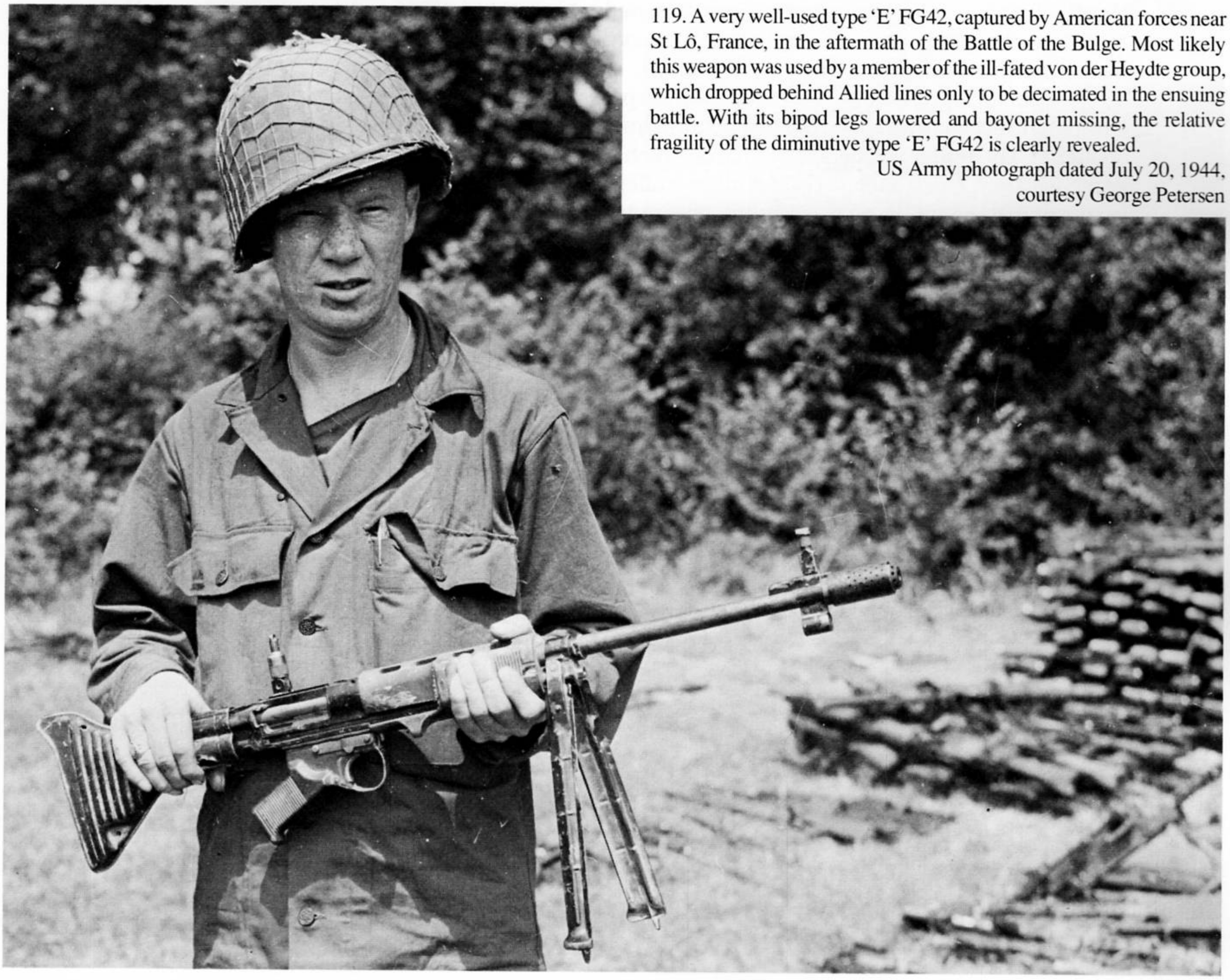
Chapter Six

The Summing Up

The 'Early' Series (Types 'A' through 'E')

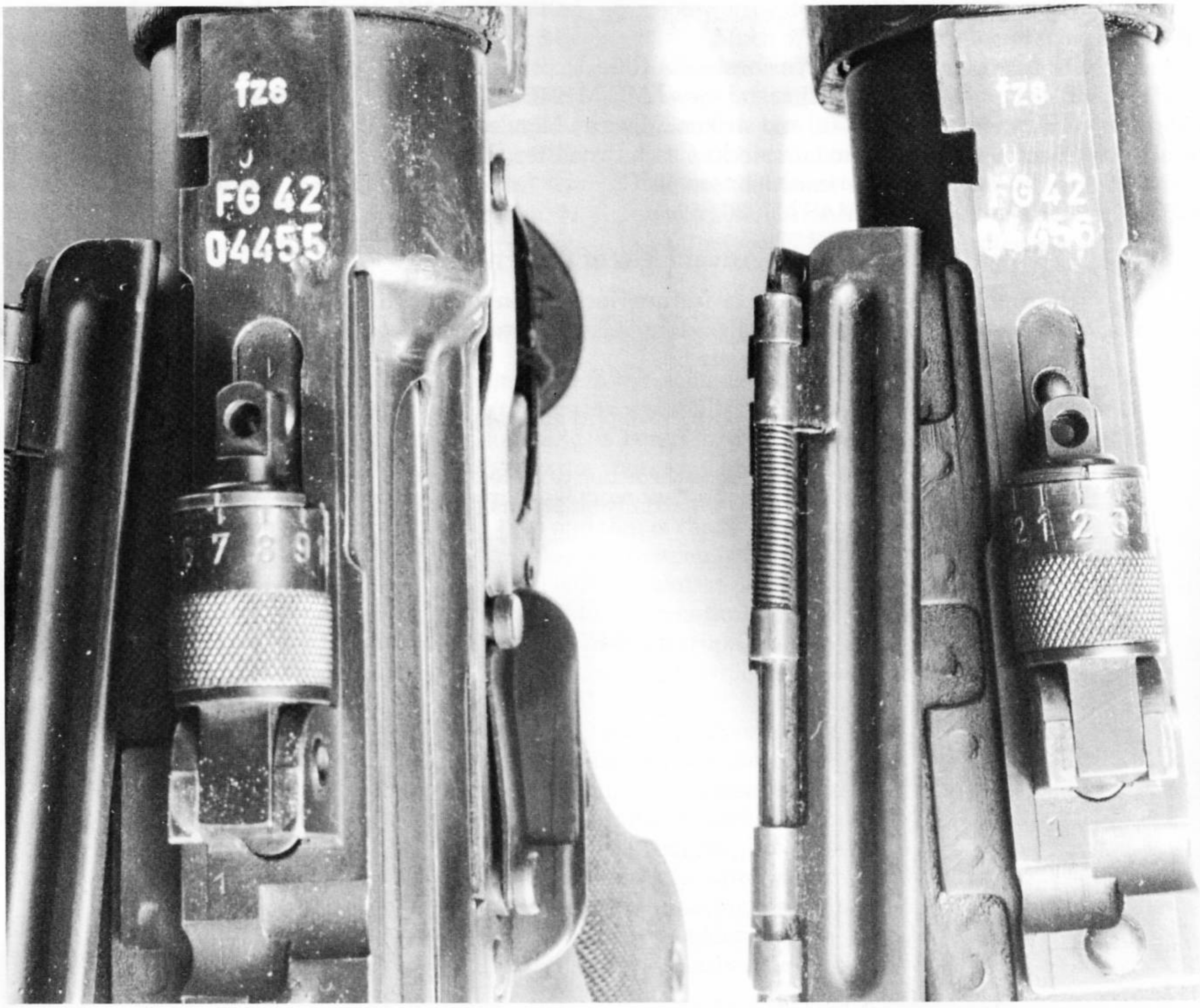
As noted, types 'A' and 'B' most likely existed as single models only. Serial no 15, referred to in chapter 3 as the "perfected prototype", was one of only about 50 type 'C' weapons made. Of the six type 'D' guns featured in the Tarnewitz endurance trial the highest serial number is 038, which is well within the mentioned Rheinmetall test series of 50 guns. Total production of at least 2,101 'early' FG42s, therefore, is substantiated by the existence of type 'E' serial no 1999 (fig 58).

A Wartime American Appreciation of the FG42



119. A very well-used type 'E' FG42, captured by American forces near St Lô, France, in the aftermath of the Battle of the Bulge. Most likely this weapon was used by a member of the ill-fated von der Heydte group, which dropped behind Allied lines only to be decimated in the ensuing battle. With its bipod legs lowered and bayonet missing, the relative fragility of the diminutive type 'E' FG42 is clearly revealed.

US Army photograph dated July 20, 1944, courtesy George Petersen



122. A rare picture indeed – two consecutively-numbered type 'G' FG42s of Krieghoff manufacture (code 'fzs'). These are the highest-number type 'G's seen during the course of this study. Note the provision for 'universal' scope mounting, as shown in fig 129 no 4.

Courtesy Ministry of Defence Pattern Room, Nottingham, photo by Thomas B Dugelby

[thus] cutting down the number of necessary magazines which must be carried.

(d) High line of sight prevents distortion of target due to heat waves.

(e) Folding sights prevent damage as the weapon is carried by paratroopers, or when not in use.

(f) Reversible bayonet.

(g) Telescopic sight.

Disadvantages of Design

The FG42 has been produced with apparently little thought as to the difficulty and cost involved in [its] manufacture. The cost of a weapon of this kind manufactured in the United States would be excessive..

Type 'G' Manufacturers and Quantities Produced

Heinrich Krieghoff Waffenfabrik of Suhl made most of the type 'G' FG42s, marking them with their code 'fzs' and a distinctive 5-digit serial number. Another firm, L O Dietrich of Altenburg (in southeastern Germany near the Jugoslavian border) also manufactured type 'G' weapons, bearing the code letters 'gcy' and a four-digit serial number. Several 'gcy'-coded specimens have been examined, their serial numbers suggesting that Dietrich (see fig 80, and compare with fig 129 no 5) actually made less than 500 type 'G' FG42s before being overrun by the Russians.

Although we shall probably never know the exact number of FG42s produced in total, the authors have examined numerous examples both in North America and Europe, and, as regards the type 'G', beginning with Tom Dugelby's own Krieghoff serial no 00004, the highest-number type 'G' FG42 seen up to the time of this writing is that pictured in fig 122 (right): no 04456. (The two consecutive guns in this Pattern Room photograph were both likely 'liberated' brand-new and unissued from the Krieghoff factory at the end of the war, indicating that these are very late serial numbers indeed!)

Adding to this last number the estimated 2,101 'early' series (types 'C', 'D' and 'E') guns produced, and the maximum 500 'gcy'-coded type 'G's, it appears that less than 7,500 FG42s of all types were produced in total.

There are rumours of yet another FG42 contractor, I C Wagner of Mulhausen, Thüringia, (code letters 'gal'), which possibly manufactured components. However, none of the weapons examined to date bear the 'gal' code, and so production cannot be substantiated save by those contractors mentioned above.

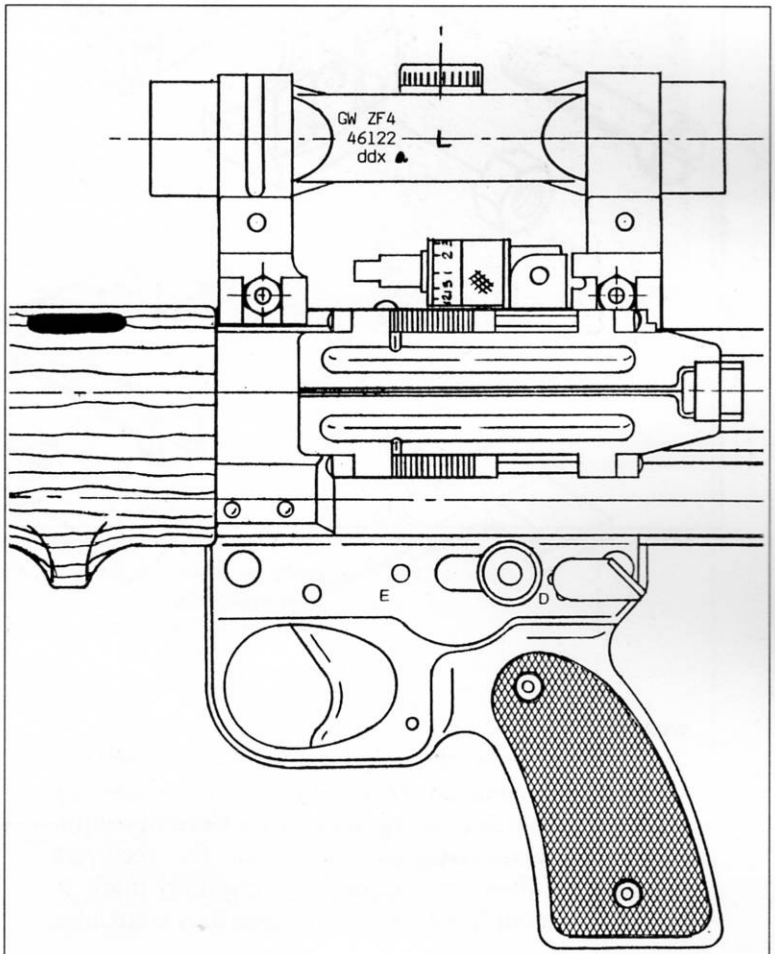
Optic Sights and Mounts for the Type 'G' FG42

By the time the type 'G' was ready for issue the ZFG42 telescope (discussed in chapter three, above) had been superseded by the Voigtländer *Gewehr Zielfernrohr 4* (GwZF4; rifle telescopic sight model 4), a 4-power, drawn-steel unit used universally on several German small arms of the period, notably the bolt-action K98k, the semi-automatic G43, and the MP44 (StG44) assault rifle.

Three types of ZF4 mounts were developed for the type 'G' FG42:

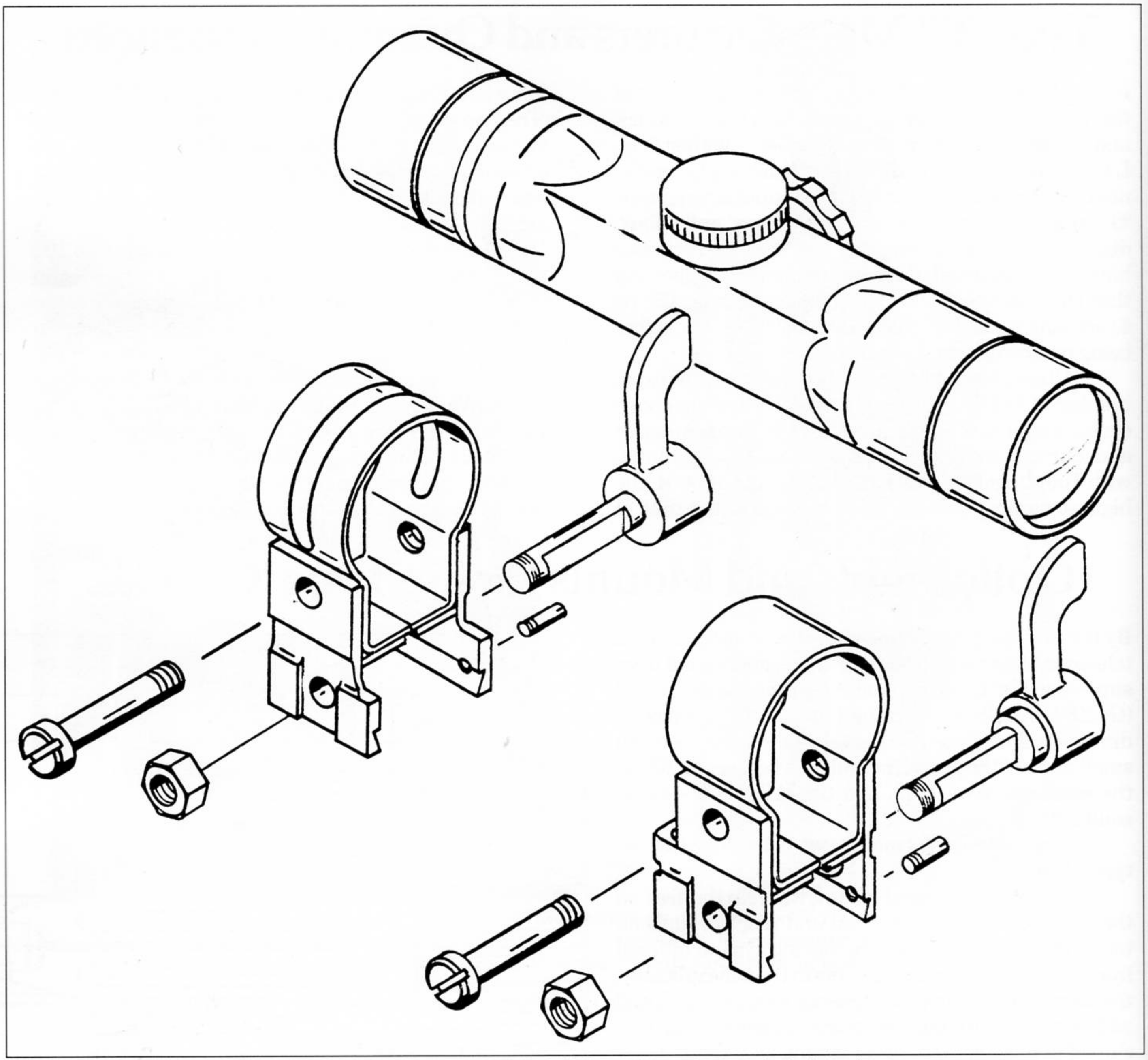
1. An early, two-ring mount, wherein the 'feet' on the rings mounted on the front and rear dovetails on top of the FG42 receiver. The locking system differed from that of the other two mounts in that, inexplicably, the normal receiver locking recesses were not used, and additional half-round, transverse grooves were machined in to accept this novel mount.

2. A stamped, sheet-metal mount, referred to in German as the "swallow-tail" mount, which clamped onto the rear receiver dovetail for a distance of only about half an inch. (This is the mount described above in the final edition of D. (Luft) T.6194). A half-round bolt was used to locate the mount, and the front end was clamped onto the front portion of the receiver dovetail. FG42s equipped with this mount had the rifle's serial number engraved on the side of the ZF4 scope and also onto the left-hand side of the butt of the



123. Left side closeup view of the receiver area of a type 'G' FG42 with the Voigtländer (code 'ddx') GwZF4 telescope mounted in the 'two-ring' mount, showing typical markings for this configuration.

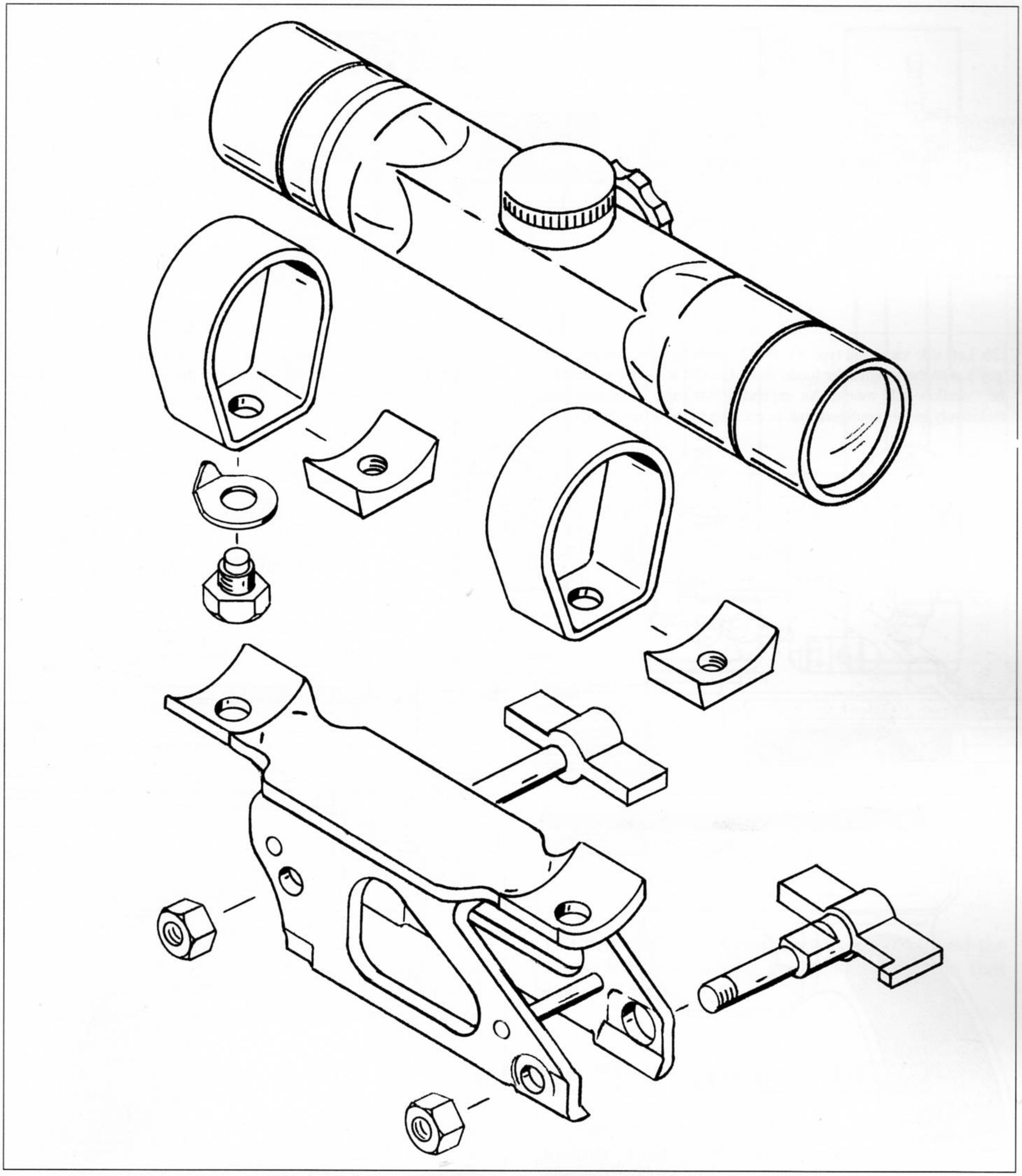
Drawing by Thomas B Dugelby



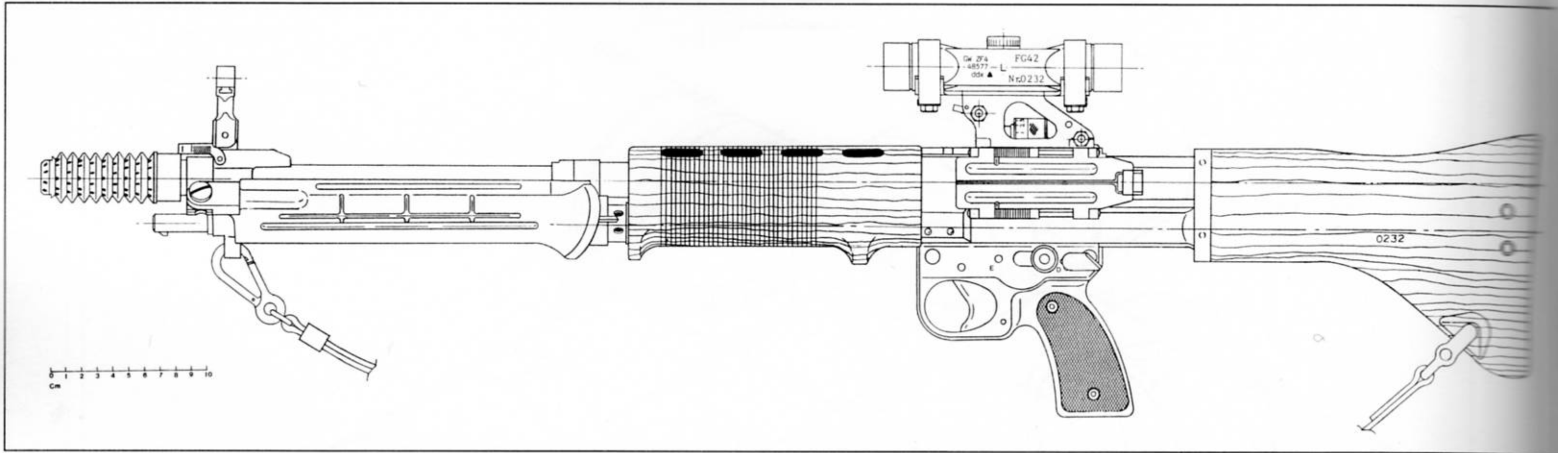
124. Left side exploded isometric view of the early 'two-ring' telescopic sight mount made for low-serial-number type 'G' FG42s as manufactured by Krieghoff (code 'fzs'). This was the only mount to utilise the half-round transverse locking grooves as shown in fig 129 no 3.
Drawing by Thomas B Dugelby

weapon.

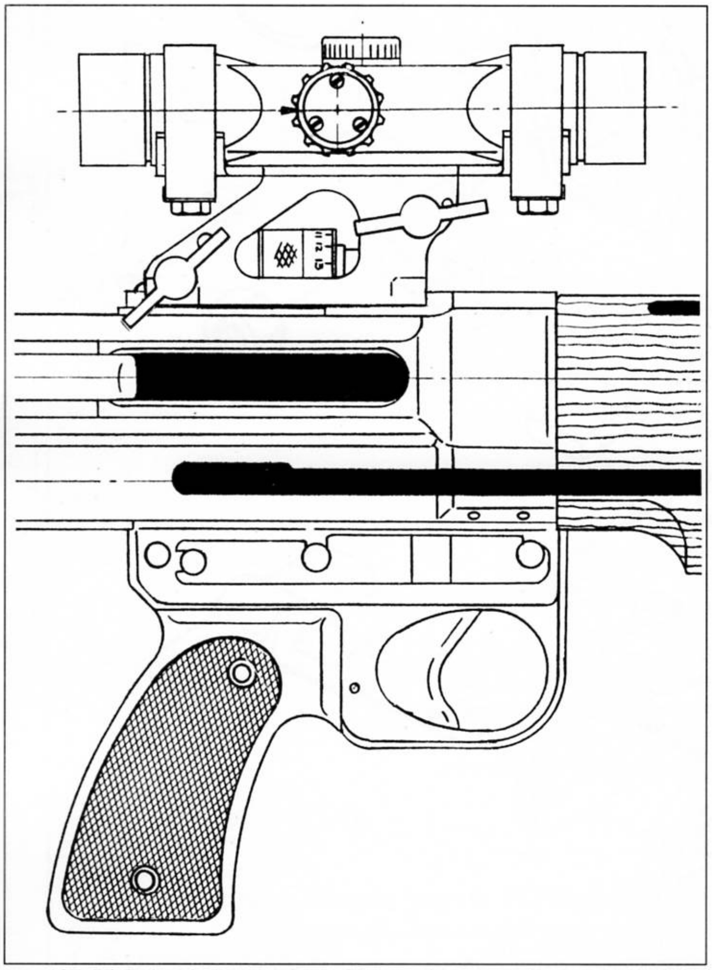
Interestingly, the only type 'G' FG42s which are today able to be fitted with this mount were made by L O Dietrich of Altenburg (code 'gcy'). Careful examination of several Krieghoff-made (code 'fzs') receivers reveals that they were apparently originally made to accept this mount, but for some reason they were later modified by means of further machining which cut away the forward portion of the left-hand receiver dovetail, thus leaving the front end of the "swallow-tail" mount with virtually nothing to clamp to. (Perhaps this accounts for the unique and painstaking serial numbering of the scopes and butts of sniper rifles equipped with "swallow-tail" mounts).



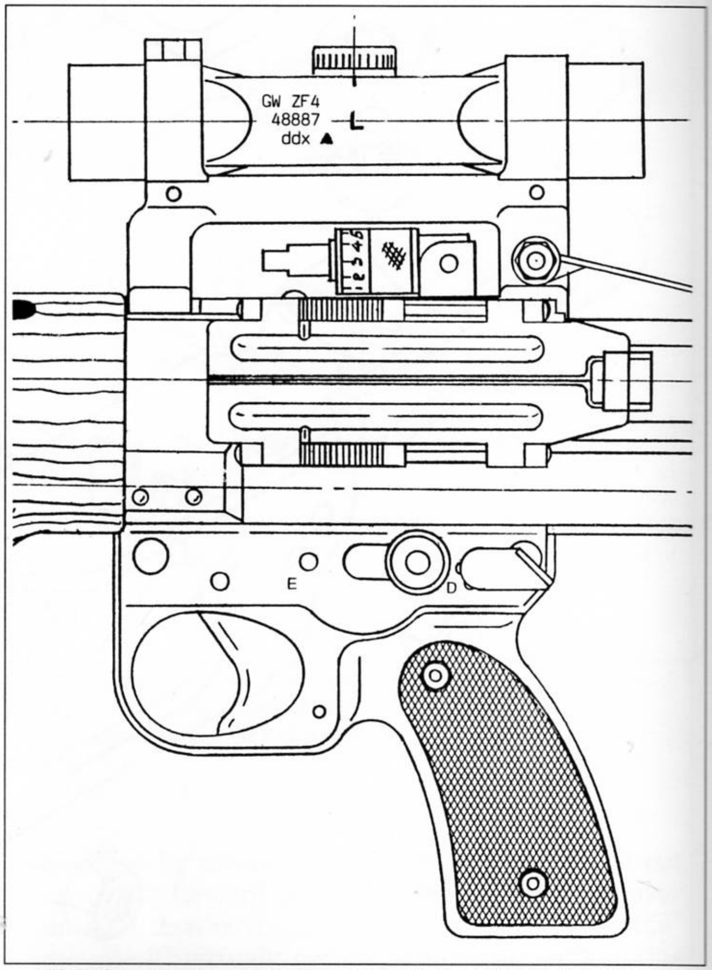
125. A left side exploded isometric view of the "swallow-tail" mount for type 'G' FG42s as manufactured by L O Dietrich (code 'gcy'). This was the only mount to utilise the unique front locking recess as shown in fig 129 no 5. Drawing by Thomas B Dugelby



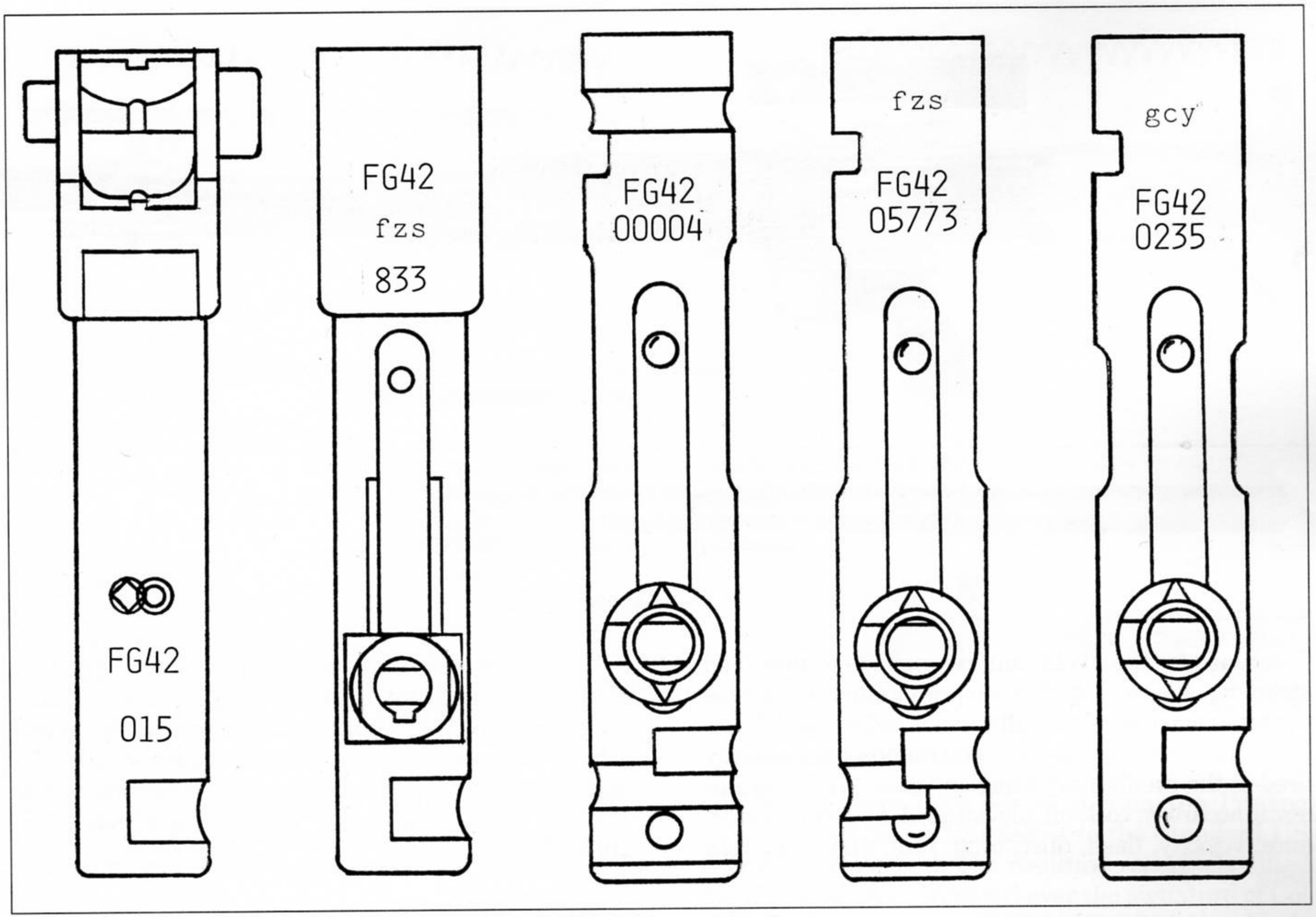
126. Left side view of a type 'G' FG42 made by L O Dietrich (code 'gcy'), with the Voigtländer (code 'ddx') GwZF4 telescope mounted in the "swallow-tail" mount. An expanded marking system was used exclusively in this configuration: in addition to the scope designation, serial number and manufacturer's code, note the weapon's (4-digit) serial number engraved on the rear flat portion of the telescope body, and also stamped into the wooden butt. Drawing by Thomas B Dugelby



127. Right hand closeup view of the receiver area of a type 'G' FG42 made by L O Dietrich (code 'gcy'), with the Voigtländer (code 'ddx') GwZF4 telescope in the " swallow-tail" mount.
Drawing by Thomas B Dugelby



128. Left hand closeup view of a type 'G' FG42 with the Voigtländer (code 'ddx') GwZF4 telescope mounted in the one-piece, cast-and-machined steel mount. This mount utilised the left-hand locking groove (fig 129 no 4). Drawing by Thomas B Dugelby



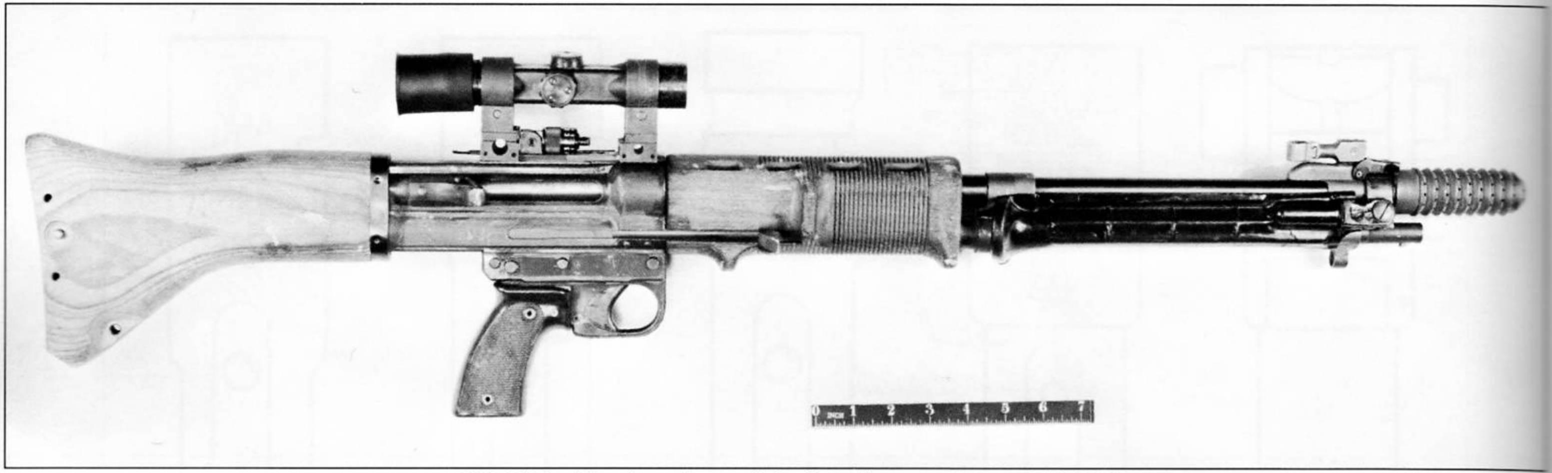
129. Drawings of receiver top mounting-plates as found on different models of the FG42.
From left:
1. The mounting plate from type 'C' FG42 serial no 015, as shown in fig 7, a toolroom prototype manufactured by Rheinmetall. Compare with fig 48: note the different placement of the Rheinmetall trademark symbol.
2. The mounting plate from type 'E' FG42 serial no 833, manufactured by Krieghoff (code 'fzs'). For use with the early ZFG42 telescopic sight and mount as shown in fig 54.
3. The mounting plate from type 'G' FG42 serial no 00004, manufactured by Krieghoff. The manufacturer's code was obliterated when the transverse locking grooves for the early 'two-ring' mount were added.
4. The mounting plate from type 'G' FG42 serial no 05773, manufactured by Krieghoff (code 'fzs'). This was the standard type 'G' mounting plate, For use with either the one-piece, cast-and-machined mount.
5. The mounting plate from type 'G' FG42 serial no 00235, manufactured by L O Dietrich of Altenburg (code 'gcy'). For use only with the "swallow-tail" mount.

Drawings by Thomas B Dugelby

3. A mount made from a machined steel casting, locating and clamping on both front and rear portions of the receiver dovetail by means of sheet-metal clamps. This mount was made specifically to fit on type 'G' rifles of Krieghoff manufacture, as it utilised the single, left-hand locking groove found only on that model FG42.

The 1946 APG Trial of the "Improved" FG42

Shortly after the end of the war, on orders from the autocratic Chief of US Army Ordnance R&D, Col René R Studler, two "improved" (type 'G') FG42s were run through the Standard US Automatic Rifle Test at Aberdeen Proving Ground. As opposed to the simple wartime 'appreciation' accorded the type 'E' gun, excerpted above, the Standard Automatic Rifle Test was a rather gruelling affair which began with a complete stripping of the arm in question to identify, number, measure and weigh all its component parts, a record being kept of the elapsed time necessary to completely disassemble and assemble the weapon, to field strip it

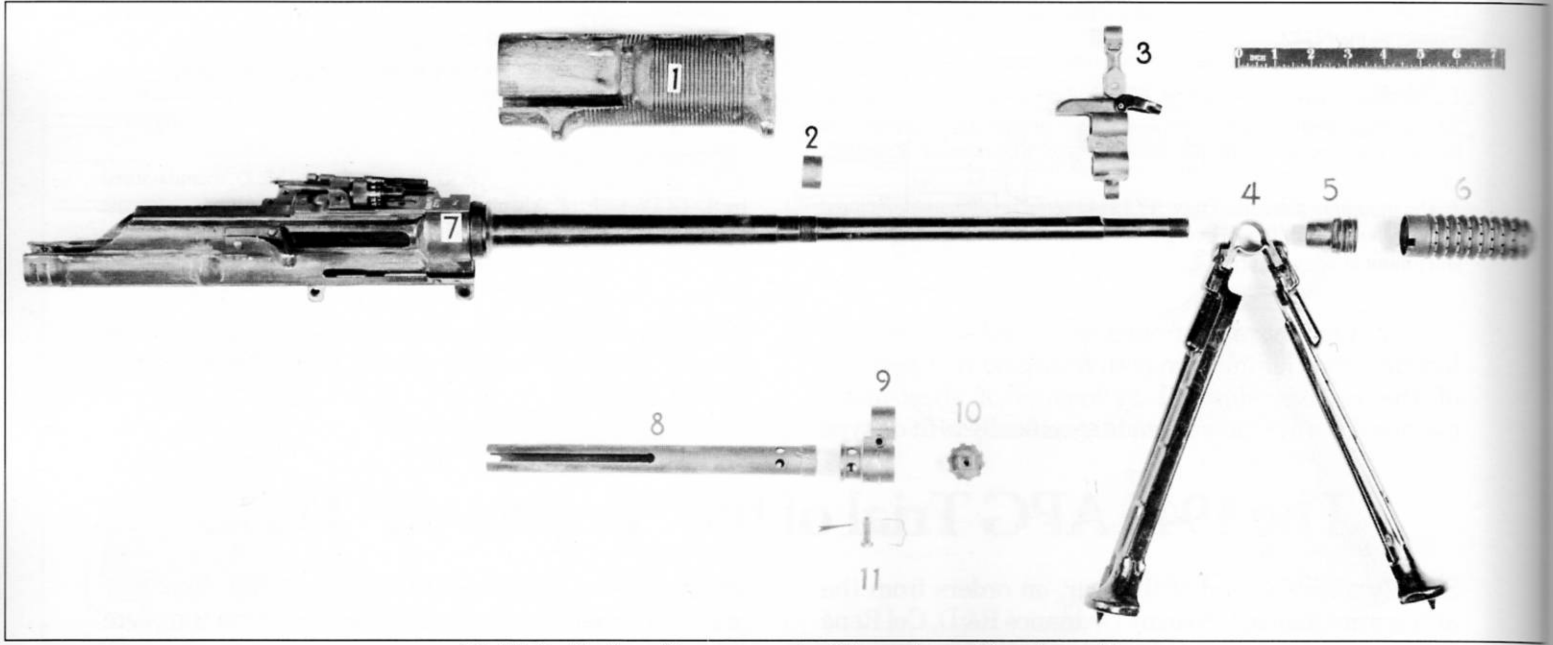


130. Right side view of one of the three "improved" (type 'G') FG42s featured in the 1946 APG Standard Automatic Rifle Test. Note the GwZF4 scope in the 'two-ring' mount (from which the clamps are missing).

Aberdeen Proving Ground photo dated March 5, 1946, courtesy James Alley

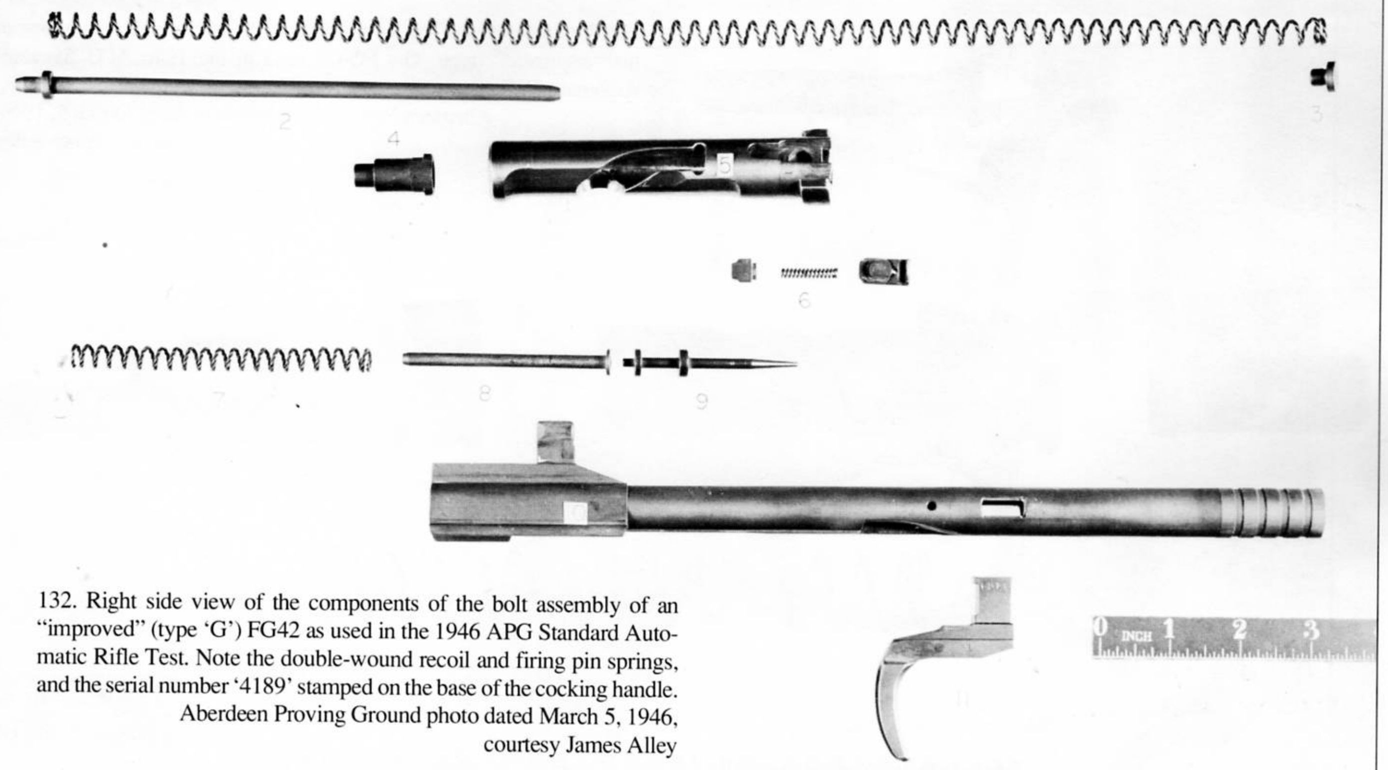
(7 seconds for the FG42) and reassemble it after field stripping. Also included in the preliminary phase was the free measurement of all springs before (and, later, after) completion of the 6,000-odd rounds subsequently fired in the preliminary function, semi- and full-automatic accuracy, cook-off, elevation, depression, endurance, velocity, flash, dust, mud, rain, and cyclic rate tests.

With the pressures of the war over at last, Col Studler was most interested to see just how the late-war German FG42 would stack up against the latest US developmental rifle, which at that time was the .30 M2-calibre T20E2, a modified, selective-fire version of the M1 Garand (discussed in Collector Grade's *US Rifle M14*).



131. Right side view of the components of the receiver and barrel assembly of "improved" (type 'G') FG42 serial no 04189, featured in the 1946 APG Standard Automatic Rifle Test. The adjustable gas regulator (no 11) is indicated by a small arrow.

Aberdeen Proving Ground photo dated March 5, 1946, courtesy James Alley



132. Right side view of the components of the bolt assembly of an "improved" (type 'G') FG42 as used in the 1946 APG Standard Automatic Rifle Test. Note the double-wound recoil and firing pin springs, and the serial number '4189' stamped on the base of the cocking handle.
Aberdeen Proving Ground photo dated March 5, 1946,
courtesy James Alley

Studler's original letter to the Commanding General of Aberdeen Proving Ground ordering the test was dated January 15, 1946, and read in part as follows:

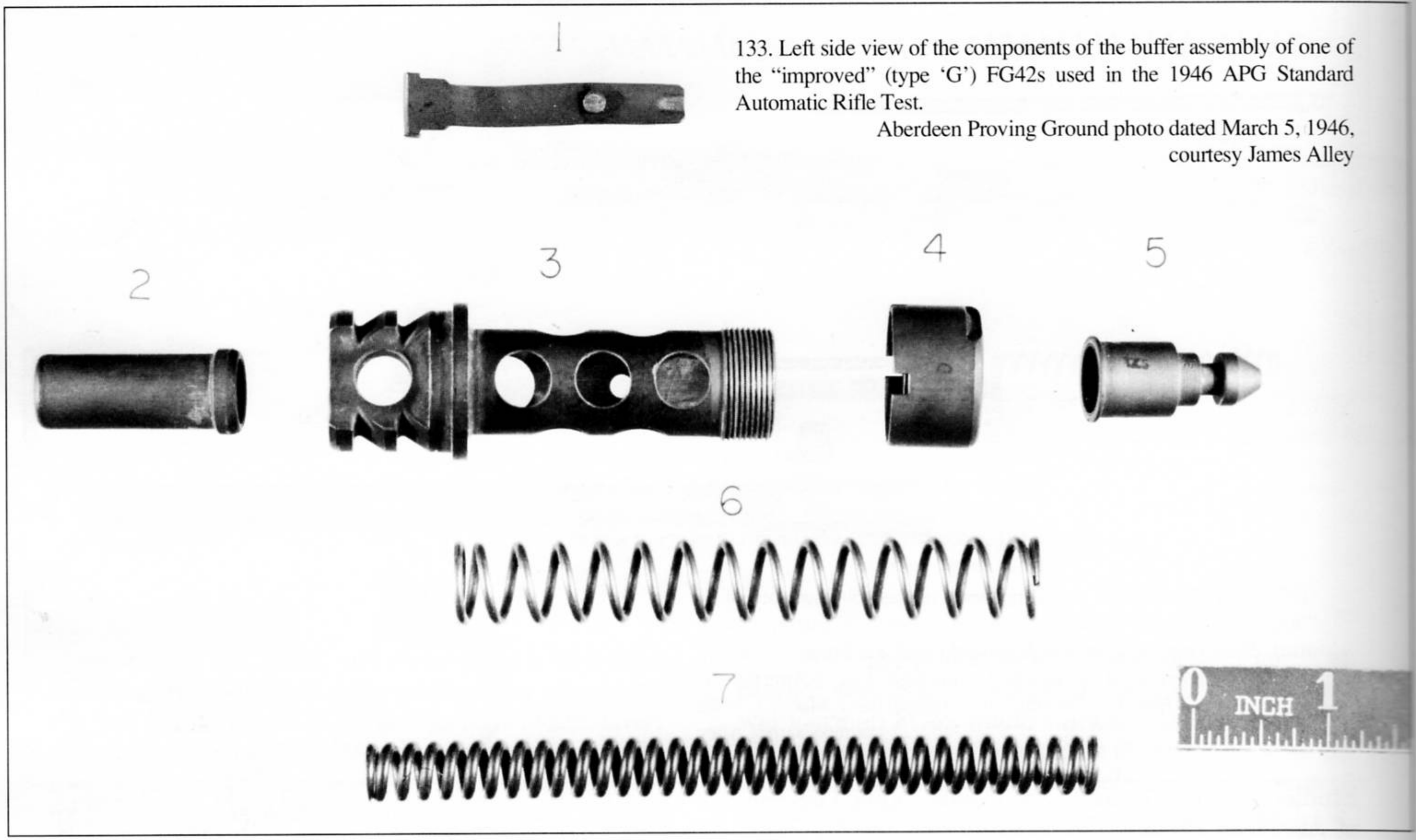
> *Subject: German Machine Gun, Caliber 7.92..FG42 (Improved)*
>
> *1. It is requested that two (2) new (or as nearly new specimens as exist) German Machine Guns, Caliber 7.92mm FG42 (improved) be subjected to the Standard Automatic Rifle Test.*
>
> *2. The improved models of these guns can be identified by the wood buttstocks, curved pistol grip and by the location of the bipod at the muzzle.*
>
> *3. The object of this test is to secure data upon the operational life of this model gun in comparison with others of domestic manufacture.In order to insure completion of the test, it is suggested that one or two extra guns be secured to supply a source of spare parts.*
>
> *4. Sufficient accuracy firing should be done with the telescopic sight to determine its effect on accuracy during single shot fire and short bursts of automatic fire, in comparison with the usual iron sights..*
>
> *..By Order of the Chief of Ordnance*

Over the period March 18 to April 4, 1946, three "improved" (type 'G') FG42s, serial nos 04180, 04189 and 04619, were duly borrowed from the Proving Ground Museum and subjected to the Standard US Automatic Rifle Test. The resulting report, classified 'Confidential', was prepared over the signature of Col E H Harrison, at that time the Chief of Aberdeen's Arms and Ammunition Division. It listed the previous firing history of the subject weapons as 'unknown', but recorded that two of the rifles, nos 04180 and 04619, had managed to complete the 6,000-round trial with parts substitutions, where necessary, being supplied from the spare gun.

The 7.92mm ammunition used was part of a lot produced by the Western Cartridge Company (headstamp WCC) under a contract made with the Nationalist Chinese government.

In the accuracy test, the average extreme spread for 20 rounds fired automatically at 50 yards range in bursts of 5 to 10 rounds from the prone position, using iron sights, was a creditable 9.83 inches. For 10-round groups of semi-automatic fire at 100 yards using a bench rest, this figure dropped to 6.34 inches, and dropped again, when the test was repeated with telescopic sight replacing the iron sights, to 5.79 inches.

It proved impossible to gather enough meaningful data to satisfy item 4 of Col Studler's request, however, as the two GwZF4 telescopes from the Proving Ground collection both proved problematical: "..Reticule of scope shifted when attempting to shoot



133. Left side view of the components of the buffer assembly of one of the "improved" (type 'G') FG42s used in the 1946 APG Standard Automatic Rifle Test.

Aberdeen Proving Ground photo dated March 5, 1946, courtesy James Alley

the first target...Reticule appeared to be loose. This scope was replaced by spare scope. The spare scope caused impacts 7 ft high in elevation and 3 ft right windage at 300 yards. The elevation was zeroed by adjusting the internal adjustment, but when the windage was adjusted internally, it changed the focus of the sight and gave a blurred sight picture...Reticule of telescope crept to right during firing."

At one point toward the end of the first 6,000-round firing schedule, gun no 04180 was fired 100 rounds "..without a compensator for information as to flash, blast and stability of gun." The results of this experiment illustrated quite graphically the value of the excellent type 'G' FG42 muzzle brake:

"..Gun [without compensator] was very unstable, hard to hold, and the muzzle climbed upward. The flash was larger than with the compensator, blast was less. The compensator appears efficient in reducing size of flash. Blast with the compensator is not disagreeable. Flash without compensator was 24" dia x 14" long. Flash with compensator was 10" dia x 16" long.."

The conclusions and recommendations of this interesting report follow:

Conclusions

It is concluded that:

1. The general design is excellent and contains many desirable features, such as: automatic fire from an open bolt and semi-automatic fire from a closed bolt; butt plate located advantageously in line behind recoiling parts; adjustable gas port; an efficient, light, integral bipod and a unique recoil absorption system.

2. The weapon was easily and quickly disassembled for necessary cleaning.

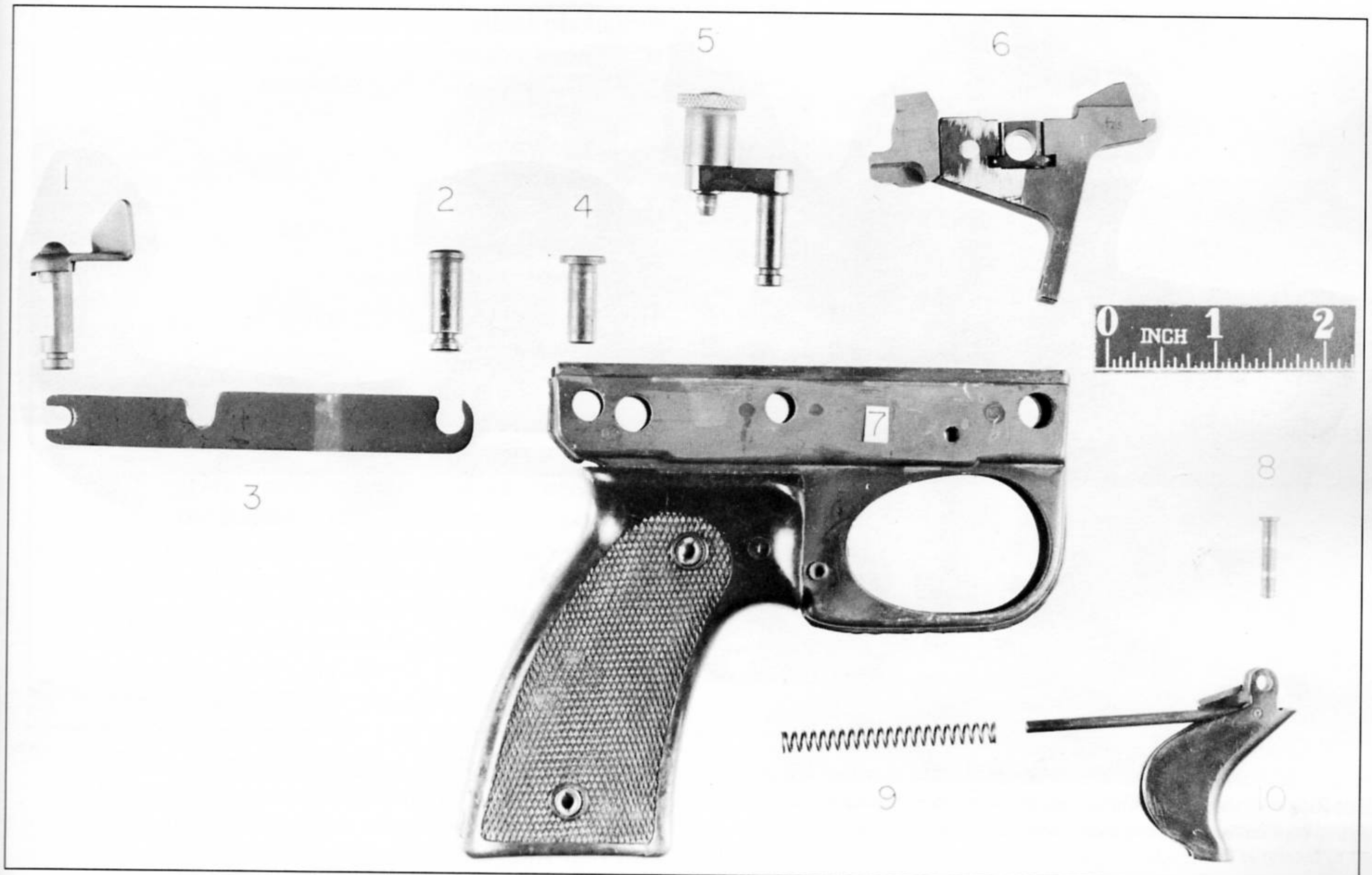
3. Full automatic accuracy was very good, being superior to that of the T20E2 rifle under comparable conditions..

4. The semi-automatic accuracy was comparable to that of the T20E2 rifle.

5. The weapon was very stable in all firing positions, and the recoil was light.

6. The combination compensator flash hider was effective as a compensator but was relatively inefficient as a flash hider. The muzzle blast was not unduly disagreeable to the shooter.

7. The general performance of the weapon was satisfactory as the majority of the malfunctions that occurred were caused by deformed magazine followers and extractor spring fatigue, which prob-



134. Right side view of the components of the pistol grip assembly of one of the "improved" (type 'G') FG42s used in the 1946 APG Standard Automatic Rifle Test. (The trigger lever, part no 6, is shown reversed; note the 'fzs' code, stamped in below the sear). The retaining plate, part no 3, retains the safety catch (part no 1), the fire selector (part no 5), the trigger axis pin (part no 8), and the front pistol grip retaining pin (part no 2).
Aberdeen Proving Ground photo dated March 5, 1946,
courtesy James Alley

ably could be easily corrected.

8. The weapon was inoperative under conditions of the standard mud test, as the bolt "froze" after very few rounds.

9. The performance of the weapon in dust was satisfactory (when the largest gas port opening was employed).

10. The weapon performed well in the standard rain test, being superior to the T20E2 rifle under comparable conditions.

11. The endurance of the magazines was unsatisfactory as the followers deformed easily and caused gun malfunctions.

Recommendations

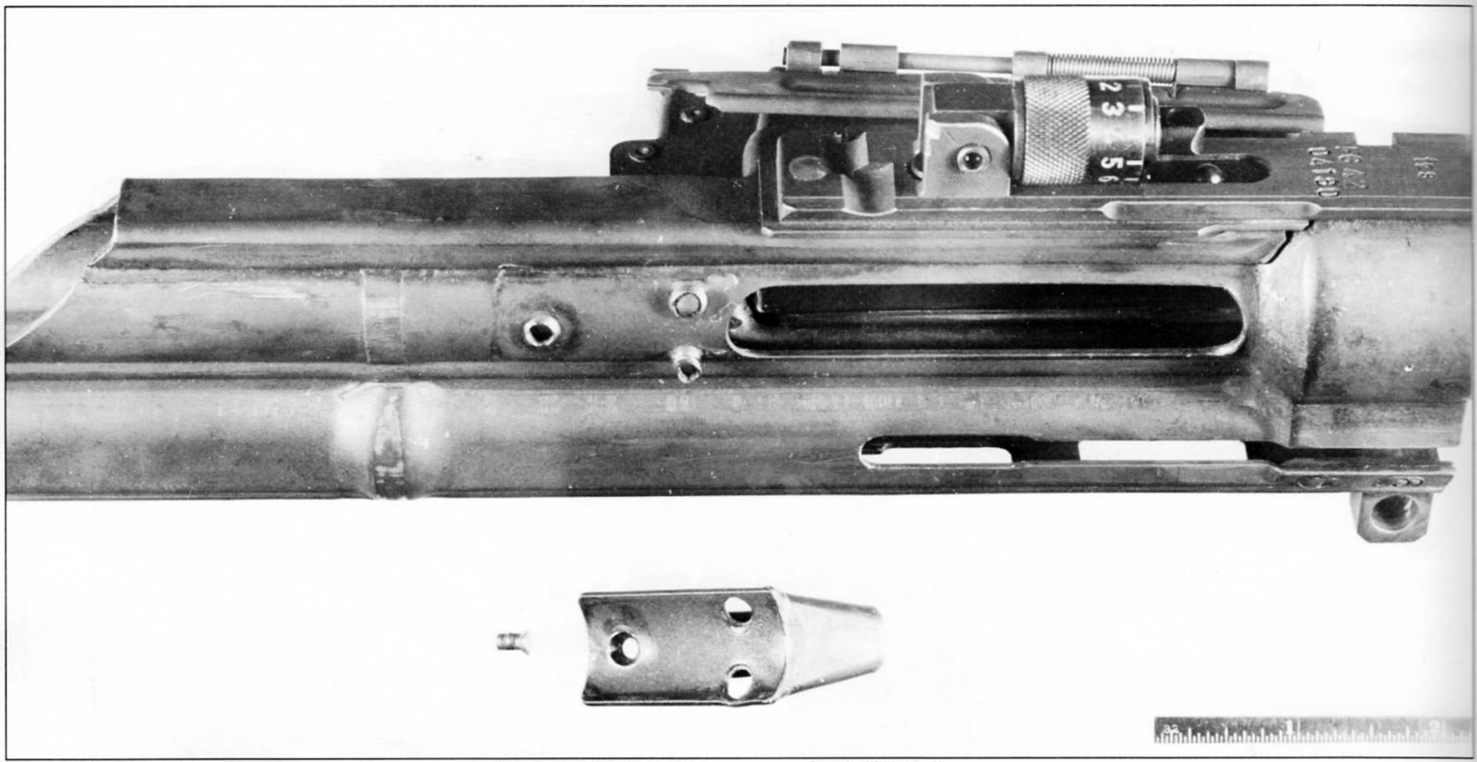
It is recommended that:

1. In view of the general performance of this weapon, it is suggested that several guns of this type be constructed to handle a cal. .30 cartridge, with the following improvements over basic design:

a. Cartridge deflector welded in place.

b. Strengthening of firing pin lug [gas piston yoke] and firing pin spring retainer to prevent breakage.

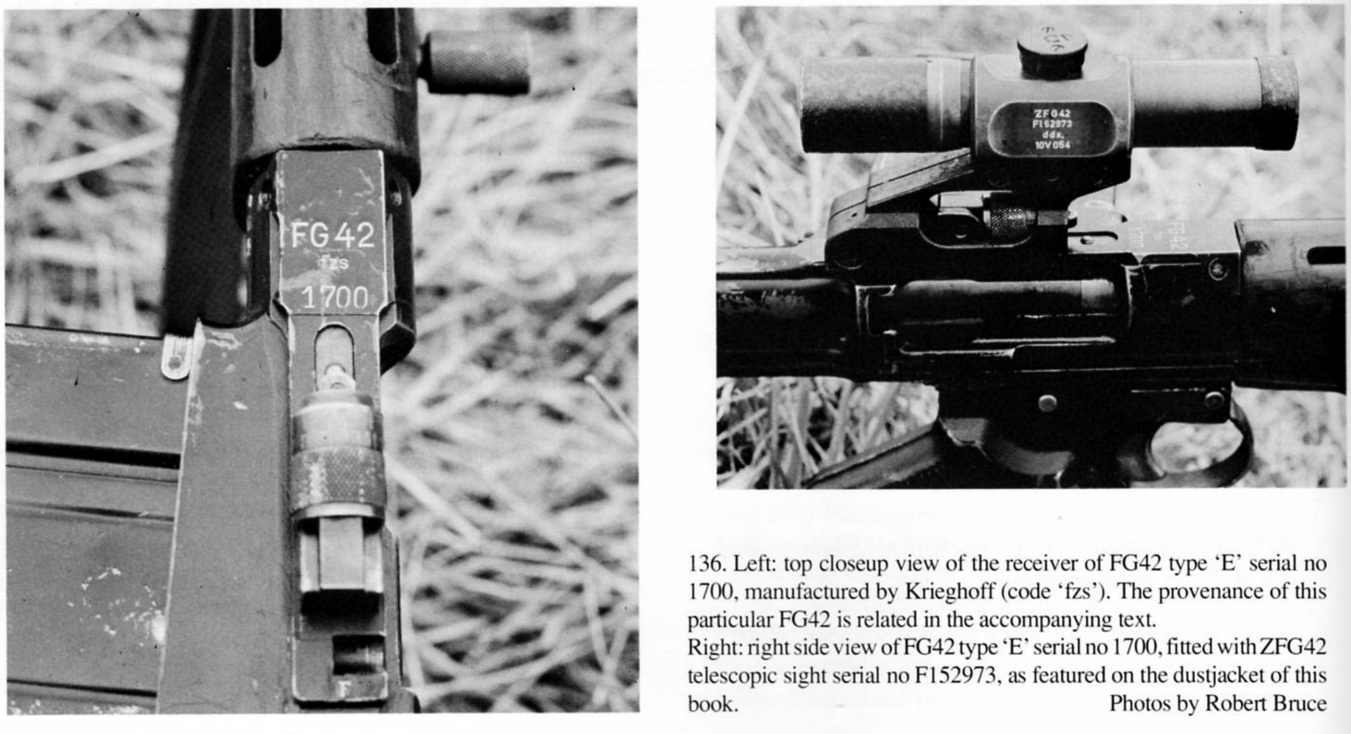
c. The operating handle be separate from the operating rod and not reciprocate with the action during firing (similar in design to that of the BAR).



135. Right side closeup view of the receiver of "improved" (type 'G') FG42 serial no 04160 after the conclusion of the APG Standard Automatic Rifle test, showing the fired case deflector which, according to the original caption, was "broken from receiver by impact of ejected cases after 3,435 rds."

Aberdeen Proving Ground photo dated March 26, 1946, courtesy James Alley

The Provenance of Two Featured FG42s



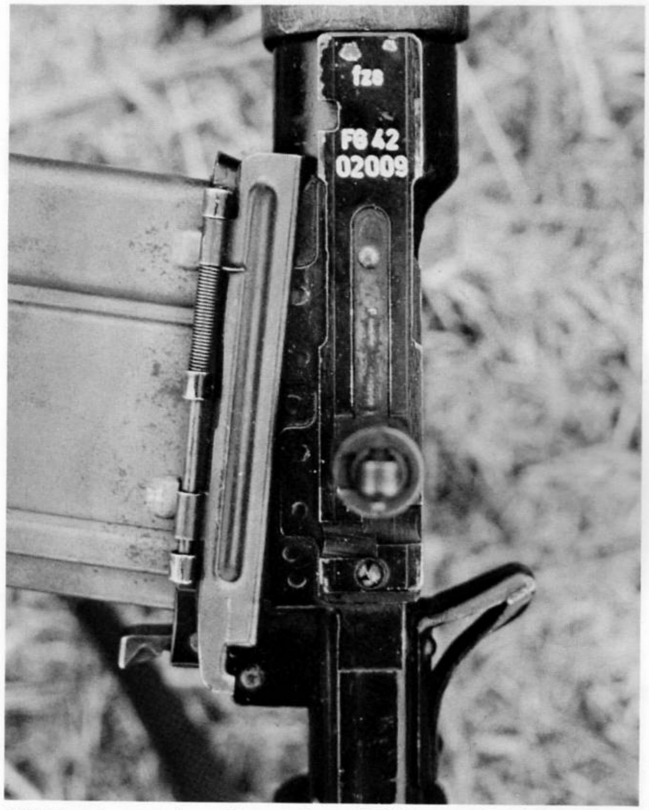
136. Left: top closeup view of the receiver of FG42 type 'E' serial no 1700, manufactured by Krieghoff (code 'fzs'). The provenance of this particular FG42 is related in the accompanying text.
Right: right side view of FG42 type 'E' serial no 1700, fitted with ZFG42 telescopic sight serial no F152973, as featured on the dustjacket of this book.

Photos by Robert Bruce

As acknowledged, a number of excellent photographs featured throughout this book are the handiwork of Robert Bruce. The *"Fallschirmjäger"* featured in the Bruce photos used on the dustjacket and endpapers of this book is George Petersen, perhaps the most advanced Luftwaffe accoutrement collector in the world, and the two FG42s pictured, type 'E' serial no 1700 (dustjacket) and type 'G' serial no 02009 (endpaper), were at the time of the photo sessions the property of the noted authority on German small arms, Robert Jenson.

Mr Jenson has kindly provided the following interesting information on the 'liberation' of these two FG42s on the battlefields of Europe:

> *..[FG42 type 'E'] number 1700 was taken from beside the body of a dead German paratrooper at St Vith in the Ardennes in early January of 1945, by Dr L B Putnam of Wichita, Kansas. Dr Putnam was a regimental surgeon with the 101st Airborne Division. He had jumped into Normandy with his unit on the evening of June 5, 1944, and was with them throughout the Bastogne seige. After the Germans retreated he and some friends were 'sight-seeing' the battle area when they came upon the dead German soldier and his weapon beside a road ditch. Dr Putnam recognised him as a paratrooper because of his distinctive helmet and the Luftwaffe wings on his tunic. The unusual rifle beside him immediately caught the eye of Dr Putnam who is to this day a gun collector, and he shipped it home in his medical trunk.*
>
> *[The dead German] was undoubtedly..a member of the von der Heydte group, which had jumped behind Allied lines at the opening of the Battle of the Bulge and was decimated, von der Heydte himself being captured.*
>
> *[FG42 type 'G'] number 02009 was found at Cassino in Italy by Sgt Allen E Klassen of Topeka, Kansas. He was a member of the 34th Division of General Clark's V Army. He did not fight at Cassino but visited the area after the battle was over and found the FG42 in the ruins of the town itself. He was attracted to it because he had never seen such a weapon before. He did not mention the presence of any dead in the area [but the gun] would have been carried by a member of the 1st Parachute Division. The FG42 was found lying beneath a window inside a room..*



137. Top closeup view of the receiver of FG42 type 'G' serial no 02009, manufactured by Krieghoff (code 'fzs'), as featured on the endpapers of this book. The provenance of this particular FG42 is related in the accompanying text. Note the *Luftamt*, above the 'f' in 'fzs'.

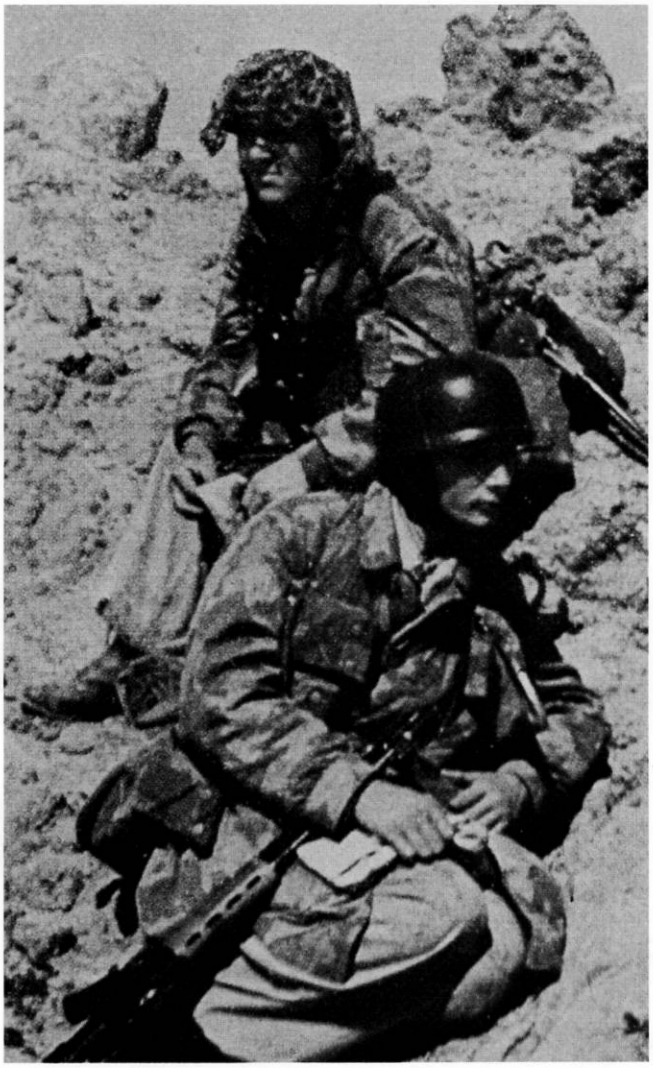
Photo by Robert Bruce

Deployment of the FG42 in World War II

According to German sources, the FG42 first saw combat on May 12, 1943, in the hands of paratroops involved in an airborne retaliation against the British landing on the island of Rhodes. In all liklihood these would have been type 'D' weapons taken from the 50-gun test series made up by Rheinmetall for the Tarnewitz trials.

Perhaps the most famous incident involving the FG42 was the daringly difficult but highly successful glider-raid on the hotel on the top of the Gran Sasso, where by Hitler's direct order Mussolini, who was being held prisoner by disaffected units of the Italian Army, was 'rescued' on September 12, 1943 by a handpicked unit of paratroopers from the *Fallschirmjäger-Lehrbataillon* led by Major Mors, and 26 Waffen-SS men under the command of SS-*Hauptsturmführer* Otto Skorzeny.

Type 'G' FG42s were among the weapons issued



138. A photo from the Mussolini rescue feature which appeared in the October, 1943 issue of the German *Signal* magazine, showing a member of the *Fallschirmjäger – Lehrbataillon* with a type 'E' FG42.
Courtesy Robert Bruce

to paratroops who, with the support of the 500/600 SS Para Battalions, were employed in a glider attack on May 25, 1944 in an abortive attempt to capture Marshall Tito at his Bosnian headquarters. Later in 1944, paras under the command of Lt-General Ramcke deployed their FG42s in the defense of the Crozon Peninsula in France.

Since the end of the war FG42s have surfaced in France, Italy, the Ardennes, and of course Germany, where they probably saw the most extensive use of all.

Some other sectors of the war in which FG42s may well have seen action include:

– with the 2nd and 3rd Para Divisions in northern France after 'D' day

– in the defense of the Il Giogo pass in the Italian Alps with the 4th Para Division

– in Sicily and throughout the entire Italian Campaign with the 1st Paratroop Corps under General Richard Hellmann

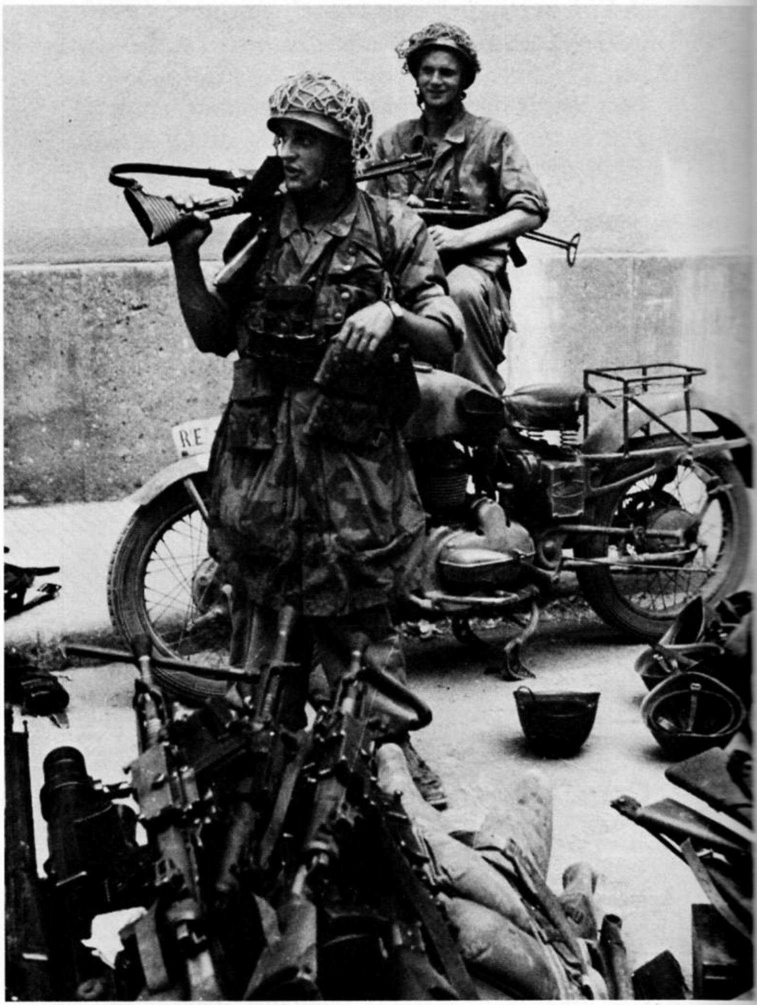
– in the northwest of Germany with the 2nd Paratroop Corps under General Staube

– with the 3rd Division Paras under *General-Leutnant* Richard Schimpf against the American Army in France

– with the 2nd Para Corps as part of the 7th Army under General Hausser, in the Contentin Peninsula of France

– during the seige of Bastogne with the 5th Division under *General-Leutnant* Hellmann

– with the 1st Parachute Army under General Schlemm against the British 30th Corps at the Rhine crossing



139. German paras in Rome, Italy, whence they were sent in the fall of 1943 as a tide of defectionism swept through the disillusioned Italian army. (Note the cache of abandoned Italian arms). The para in the foreground shoulders a type 'E' FG42, and wears the eight-magazine shoulder-harness bandolier.
Bundesarchiv photo, courtesy George Petersen

140. *General-Leutnant* Richard Schimpf, commander of the 3rd Parachute Division, with his type 'E' FG42 slung over his shoulder, addressing his men near St Lô, Normandy, in 1944.
Bundesarchiv photo, courtesy George Petersen

– in the defense of Monte Cassino by the tenacious 1st German Parachute Regiment

– with the 9th Division under General Kleinheistkamp against the Russian 1st Belorussian front during the final assault on Berlin

– during the final days of the war in Germany, when they were issued to various last-ditch units from whatever stocks of weapons then remained.

Authors' Conclusions

From a technical point of view, hardly enough can be said about the FG42 – certainly it is a masterpiece of pragmatism and a tribute to its designer, Louis Stange. As proof of this, the sobering fact is that by answering the nigh-on impossibly stringent LC-6 requirements so faithfully, Stange pared the weight and metallurgical makeup of the FG42 so close to the bone, in relation to the power of the cartridge it fires, that the structural margin of safety offered by the FG42 probably would not be acceptable in any army today.

However, having owned and fired examples of both 'early' and 'late' FG42s, the authors can conclude with the following personal observations:

1. The muzzle brake (especially of the type 'G') and the buffered buttstock are very efficient, and permit surprisingly comfortable shooting with very little felt recoil. As a flash hider, however, as graphically illustrated on the endpapers of this book, the FG42's muzzle brake might better be termed a flash *intensifier*, as firing generally produces a spectacular ball of flame about a foot in diameter.

2. The FG42 does not jump about unduly during firing, with no great difficulty experienced in keeping the sights on target during automatic bursts, resulting in an accurate fall of shot.

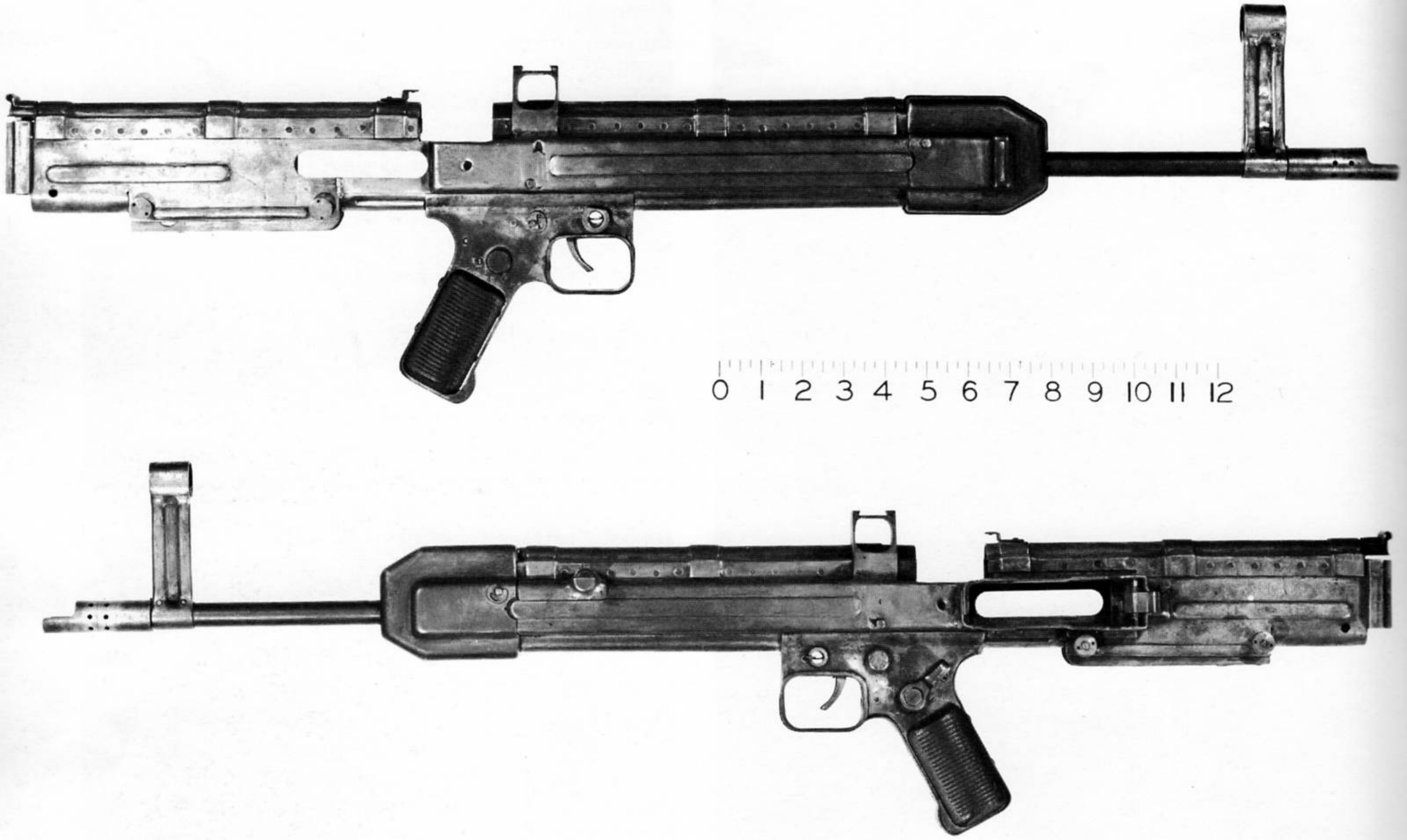
3. No difficulty in loading, cocking, applying the safety catch or selecting the type of fire desired, indicates efficient research in the positioning of the controls.

4. The addition of a gas regulator to the type 'G' provides a distinct advantage, particularly when different types of ammunition are encountered.

5. Several isolated failures to feed were traced to the feed lips of a particular magazine. Judicious application of a toolmaker's file to the inside of the lips corrected the problem and no further malfunctions occurred.

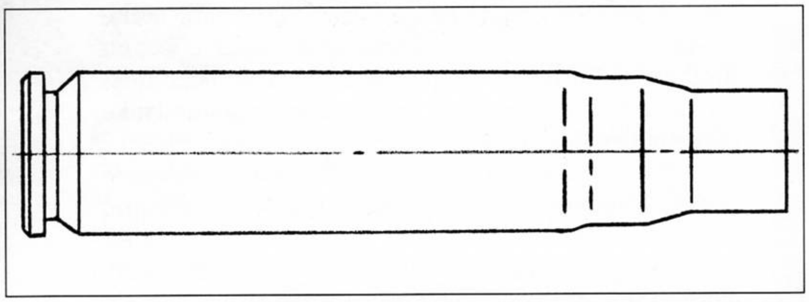
6. As shown in fig 142, the chamber profile of the FG42 produces an unusual 'double shoulder' effect on fired cases. Although its purpose has often been misconstrued, this is perhaps the supreme masterstroke of the entire design.

As with the rest of the weapon, the gas system of the FG42 was intentionally designed to be as light (and therefore as short) as possible. This meant that, for its day, the gas block was positioned unprecedentedly close to the receiver, which contributed to a relatively abrupt unlocking time. With a regular chamber profile, as soon as initial extraction broke the seal between the cartridge case and the chamber, the high-pressure gases still remaining in the chamber would have blown back through the increasingly large gap formed between the chamber walls and the withdrawing spent case, uncomfortably close to the firer's face. This potentially hazardous situation was masterfully circumvented by the introduction of an ingenious



141. Right and left side views of an incomplete, prototype late-war assault rifle, produced by Knorr-Bremse AG of Berlin-Lichtenberg. Aside from the fact of its existence, very little is known about this enigmatic weapon, except it appears to have been designed in accordance with the LC-6 specification, which led to the development of the FG42.

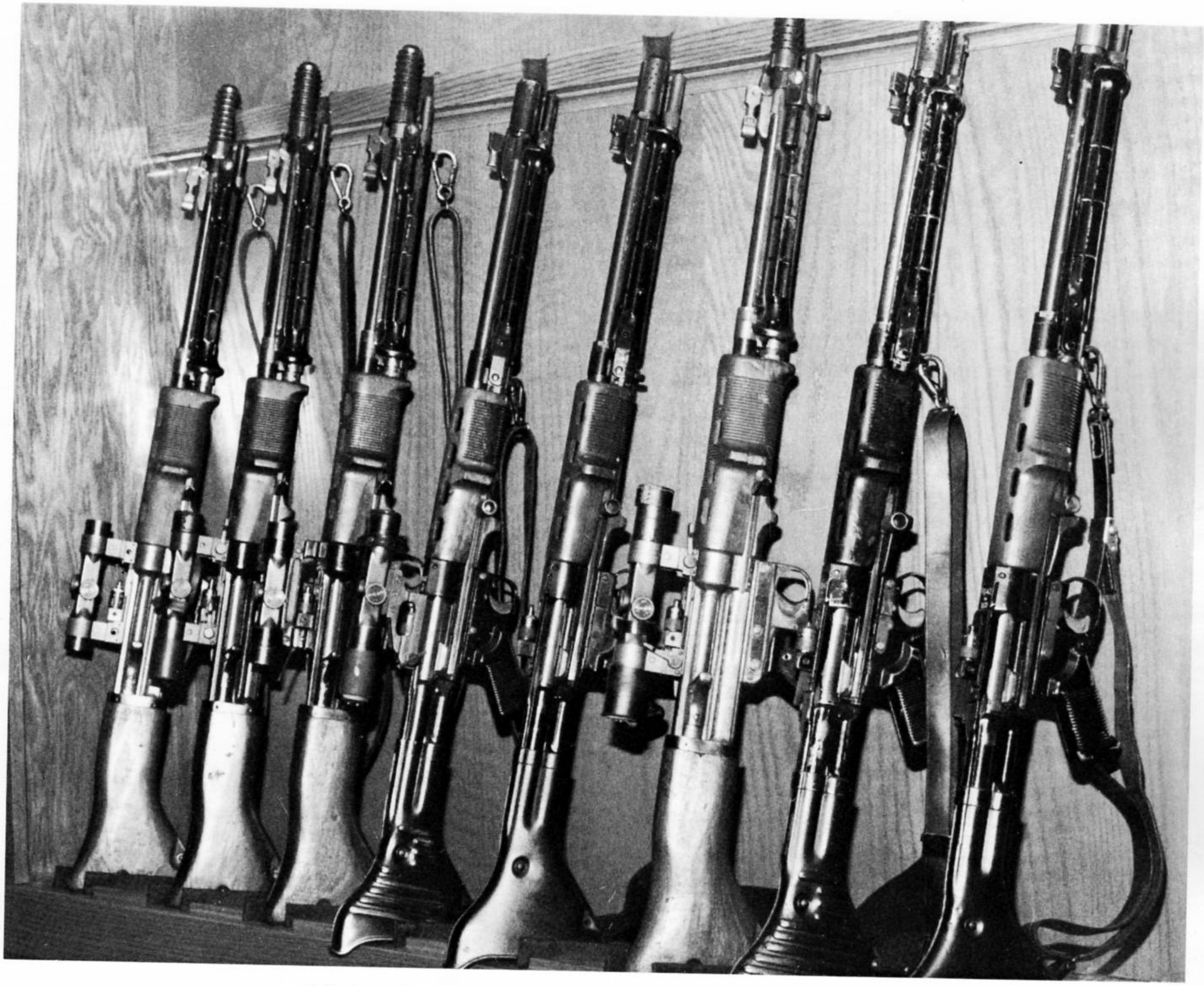
Photo courtesy Thomas B Nelson



142. A drawing of a 7.92x57mm cartridge case, after having being fired in an FG42. Note the 'double-shoulder', formed on the case by the FG42's unique compound chamber (a feature the authors admiringly call the "supreme masterstroke" of the FG42 design), the purpose of which is described in the accompanying text. Drawing by Thomas B Dugelby

compound chamber, which *fire-formed* the body of each normally tapered (and thus easily-fed) cartridge case into a virtually straight-sided *cylinder*, which continued to act as a seal against the chamber gases even as it was being extracted.

Further to this, in the CIOS (Combined Intelligence Objectives Subcommittee) report compiled after the war from interrogations of ex-Mauser Ordnance experts, it was stated by a Herr Waldermaier that experiments were conducted by Engineer Schroth, Manager of Interior Ballistics at Mauser, into the use of progressive rifling and fluted chambers in the FG42 barrel. Favourable results were obtained, but, since the experiments took place so near the end of the war, no further development was undertaken.



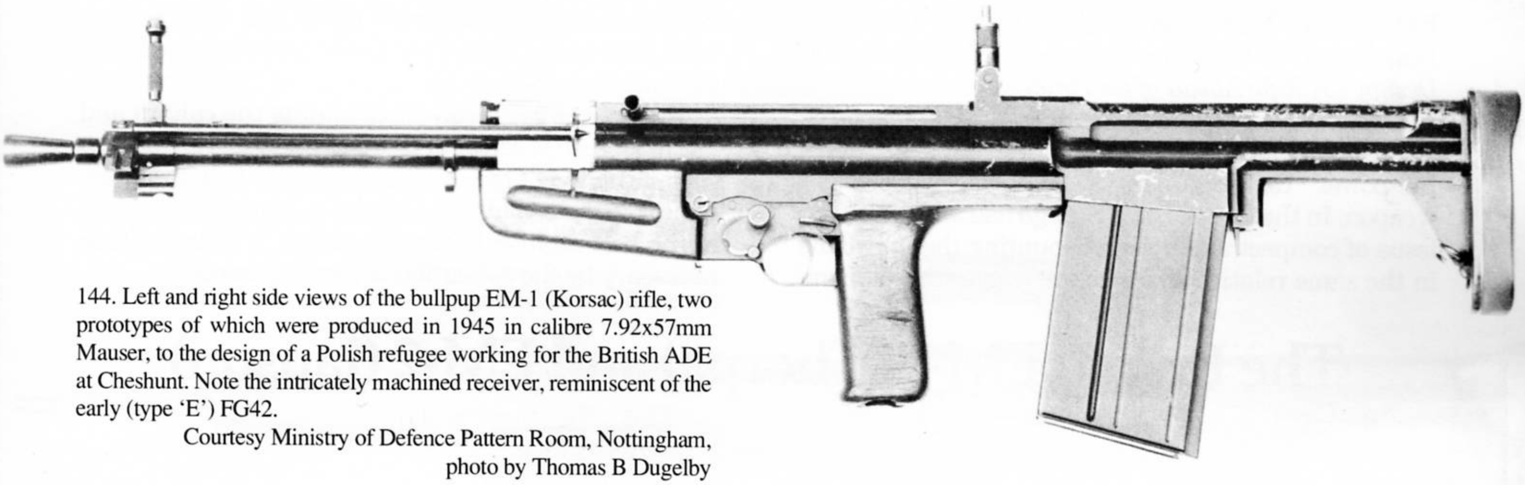
143. An enviable collection of FG42s, featuring four 'early' (type 'E') weapons (two with smooth and two with ribbed buttstocks), and four 'late' (type 'G') guns. All are the pride and joy of Byron Vickery, an attorney who lives in Columbus, Ohio, who advises that he is most interested in expanding his collection. Photo by Byron Vickery

Chapter Seven

The Postwar Legacy of the FG42

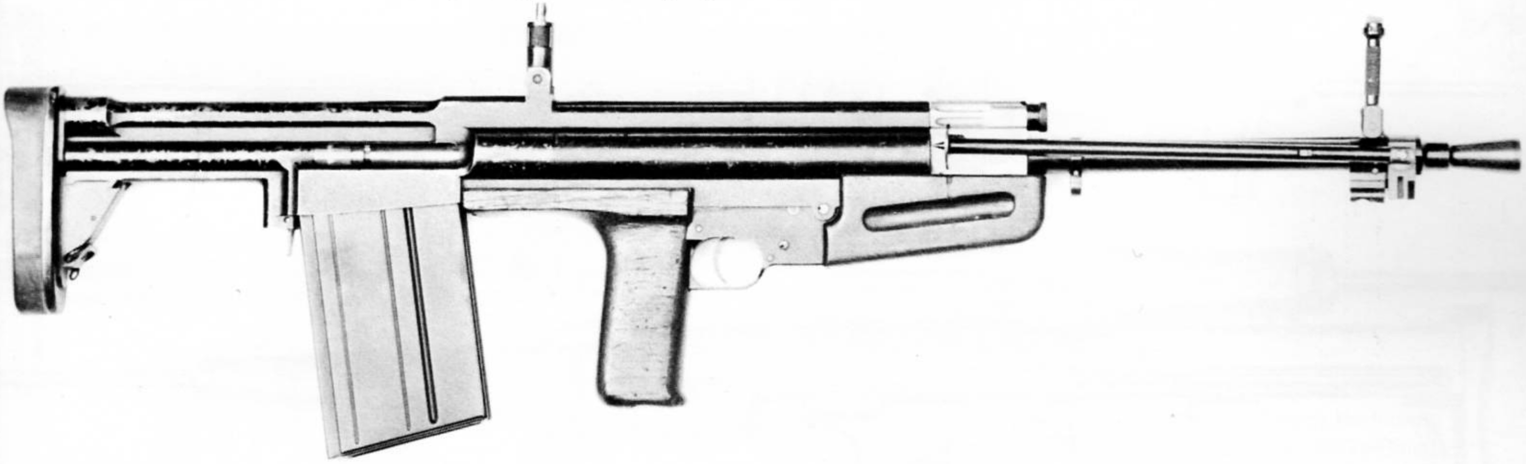
The aftermath of World War II saw all of Germany's erstwhile enemies take advantage of German wartime small arms innovations in important redesign programmes of their own. Although heralded as new developments, clearly the fundamental concepts embodied in the FG42 were simultaneously very much appreciated in a number of interesting, independent designs:

The British EM-1 (Korsac)

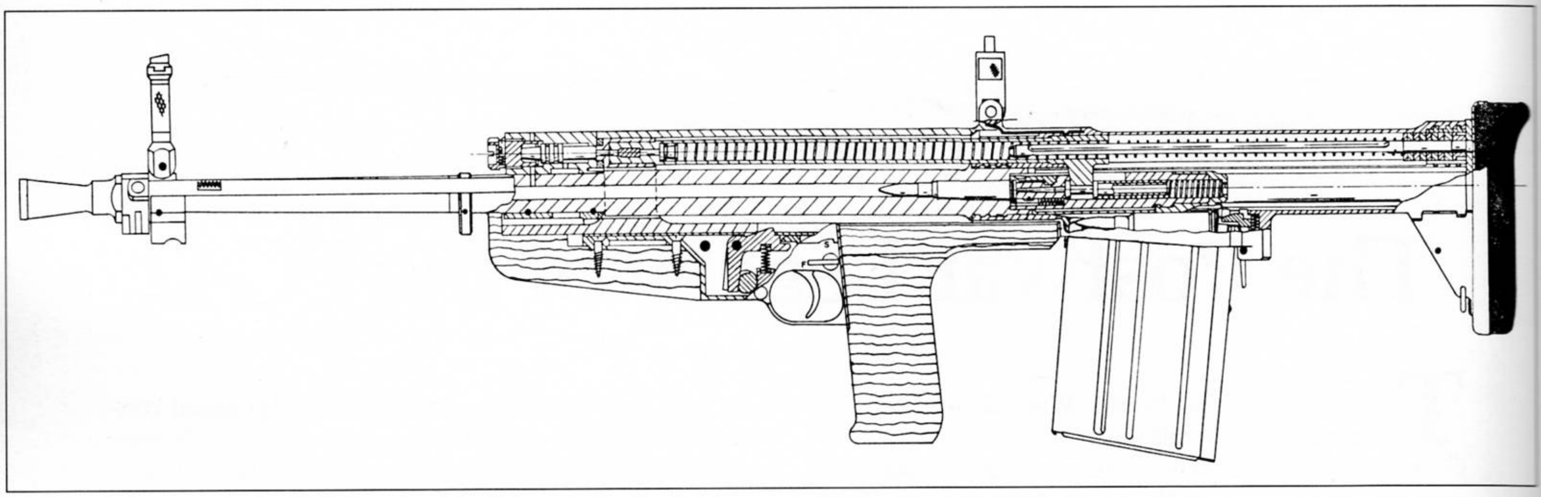


144. Left and right side views of the bullpup EM-1 (Korsac) rifle, two prototypes of which were produced in 1945 in calibre 7.92x57mm Mauser, to the design of a Polish refugee working for the British ADE at Cheshunt. Note the intricately machined receiver, reminiscent of the early (type 'E') FG42.

Courtesy Ministry of Defence Pattern Room, Nottingham, photo by Thomas B Dugelby



The British were quick to recognise the merits of the FG42 and, in 1945, the first of a series of new designs was developed by Mr Korsac of the refugee Polish gun design team working at Cheshunt in north London. Two prototypes of a rifle called the EM-1 (Korsac) were produced in the 7.92x57mm German service calibre, one in soft white condition and the other fully hardened for firing tests. (The full history and description of the

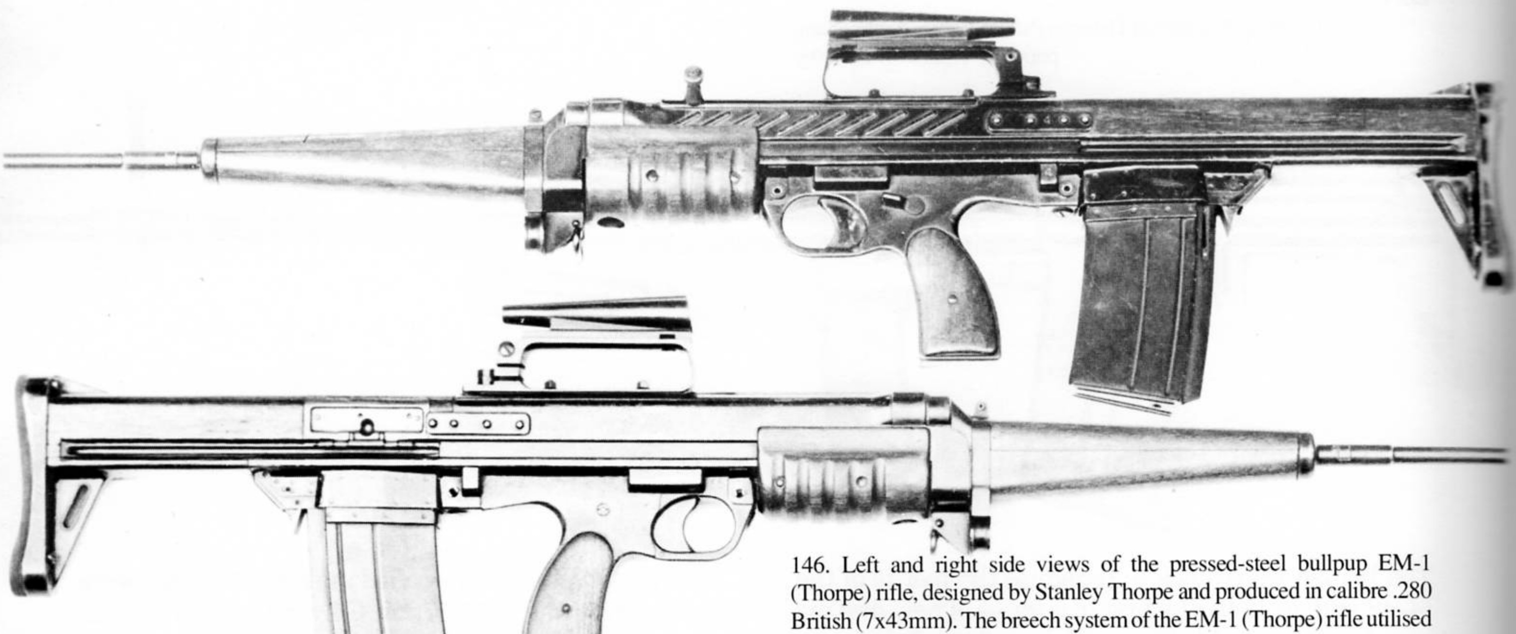


145. A reproduction of the original assembly drawing of the EM-1 (Korsac) rifle. Note the similarity of the (inverted) bolt system and the sights with those of the FG42. The gas system was complicated by the addition of a separate short-stroke captive gas piston, which drove the extension tube to the rear to unlock the bolt. Excessive friction caused by the long, 'U'-shaped sliding bent proved to be the undoing of the Korsac design.
Redrawn by Thomas B Dugelby

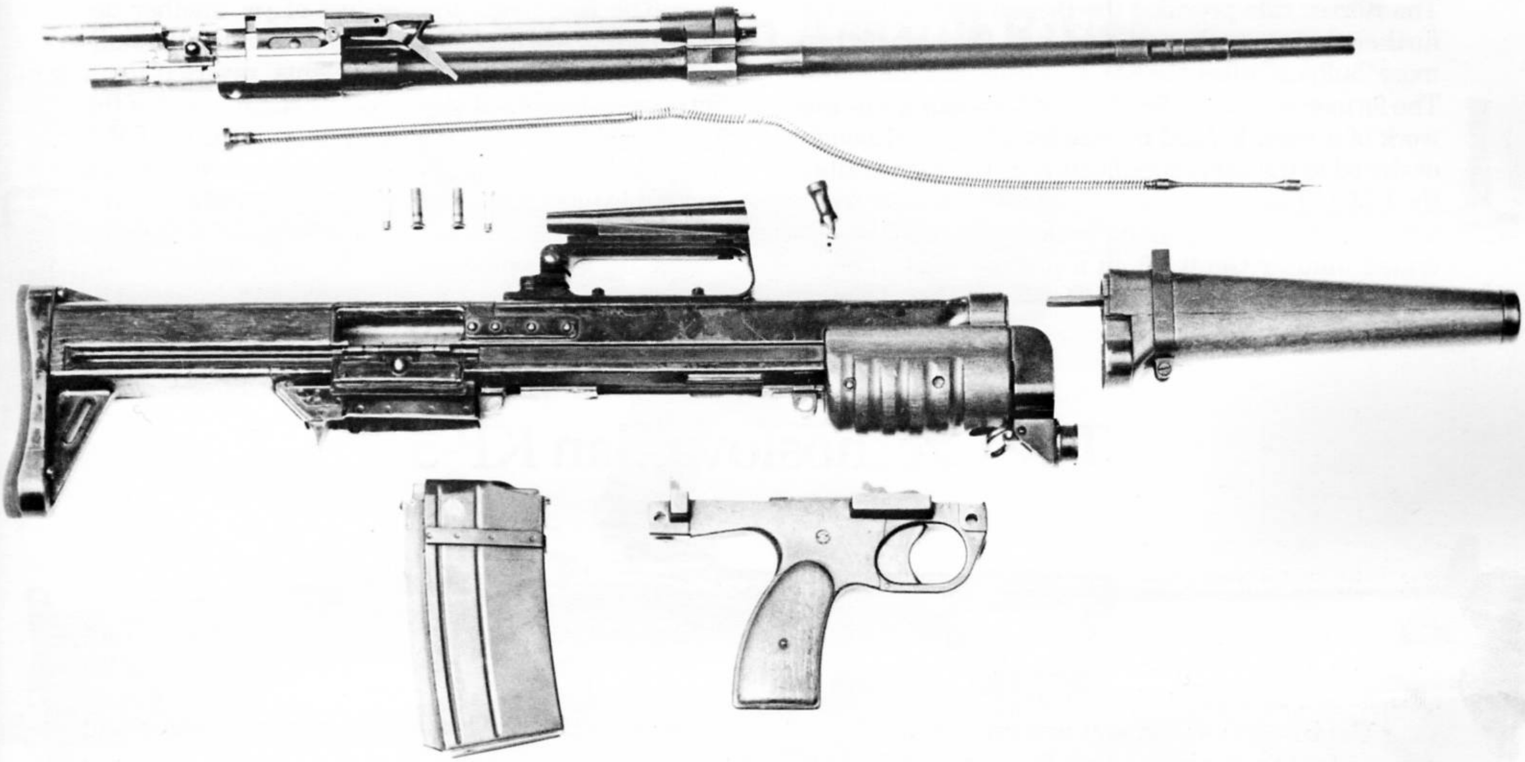
EM [Enfield Model] series is included in Thomas B Dugelby's 1980 Collector Grade book *EM-2 Concept & Design – A Rifle Ahead of its Time*).

The British requirement was initially much the same as that for the FG42 – a full-length barrel (and a full-power cartridge) in a compact, lightweight weapon. In the FG42, Louis Stange had addressed the issue of compactness by side-mounting the magazine in the same relative space as the trigger mechanism. Korsac moved the magazine down and even farther back, behind the trigger assembly, and dispensed with the butt entirely, leaving only a rubber-faced buttplate at the rear of the receiver. Retaining the calibre and the machined receiver of the 'early' FG42, Korsac also copied the FG42 gas-operated rotating bolt assembly almost without alteration except to invert the position of the bolt relative to the gas piston, a change made necessary by the relocation of the magazine.

The British EM-1 (Thorpe) and EM-2 (Janson)

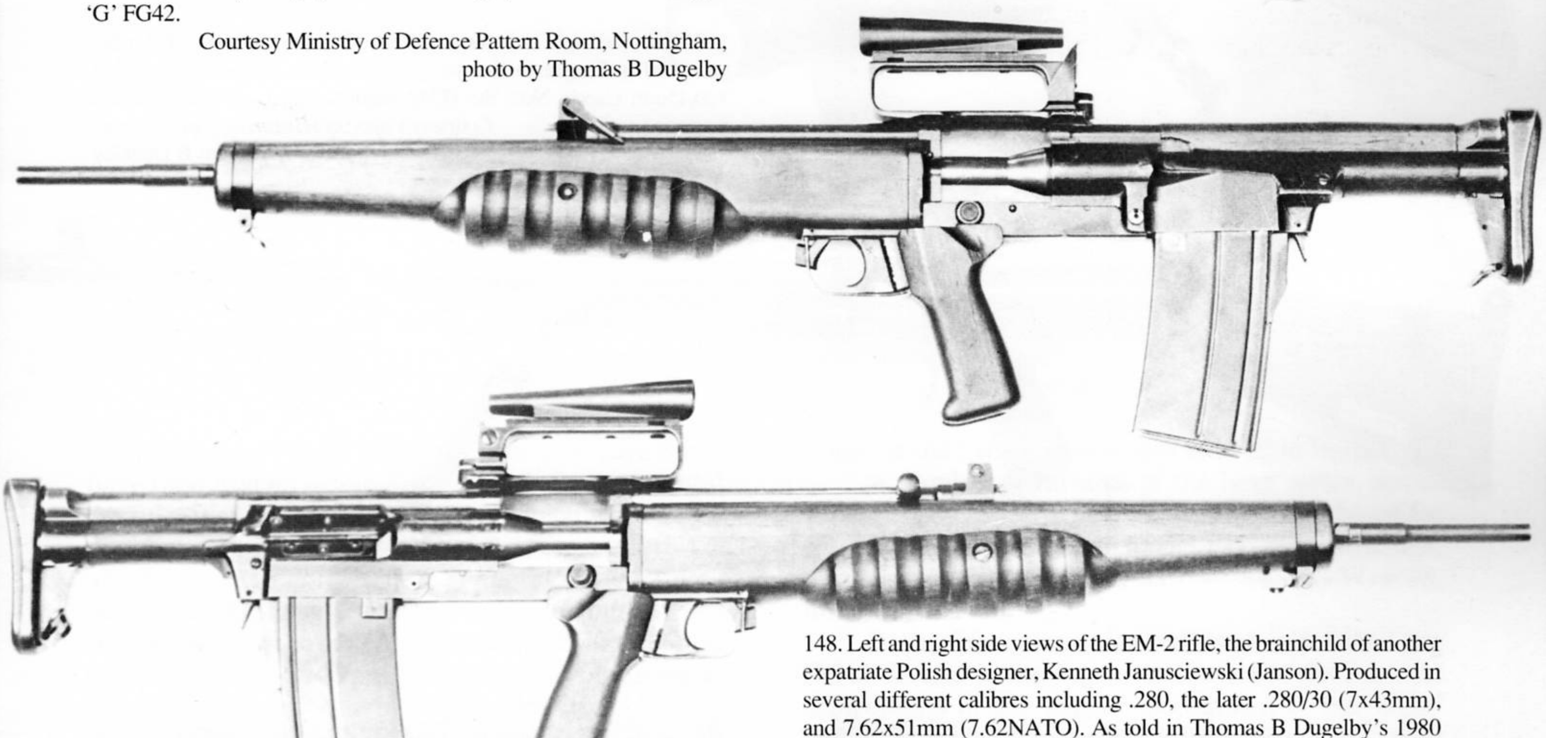


146. Left and right side views of the pressed-steel bullpup EM-1 (Thorpe) rifle, designed by Stanley Thorpe and produced in calibre .280 British (7x43mm). The breech system of the EM-1 (Thorpe) rifle utilised the interesting roller-locking concept as pioneered in the late-war, gas-operated Mauser Gerät 06.
Courtesy Ministry of Defence Pattern Room, Nottingham, photo by Thomas B Dugelby



147. Right side view of the EM-1 (Thorpe) rifle, field stripped. Note the similarity of the pistol grip and its mounting system to that of the type 'G' FG42.

Courtesy Ministry of Defence Pattern Room, Nottingham,
photo by Thomas B Dugelby



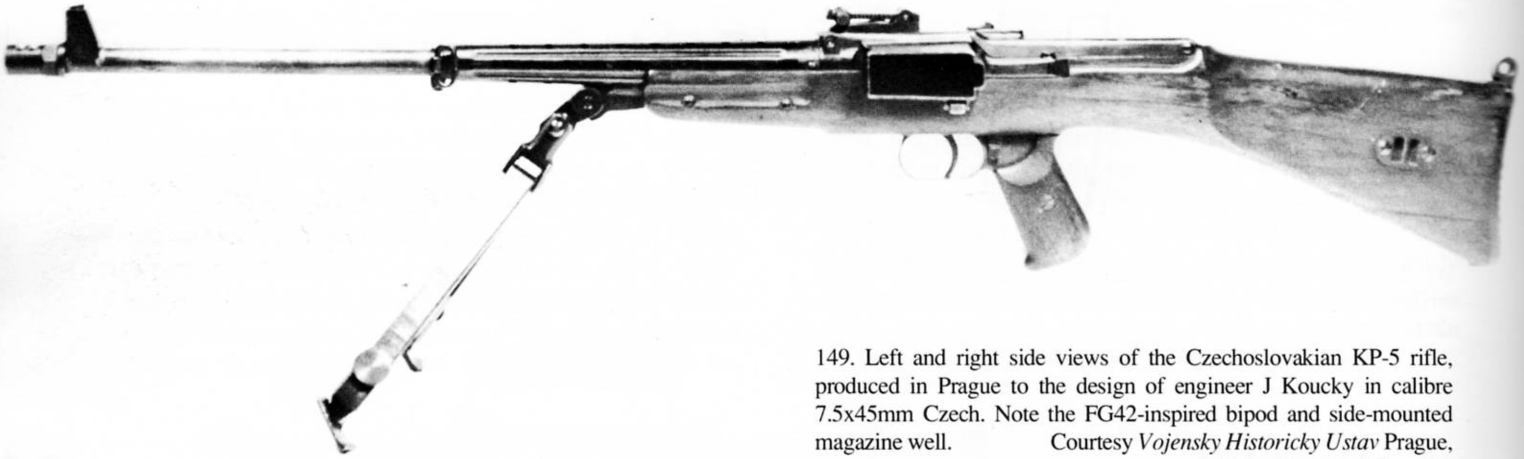
148. Left and right side views of the EM-2 rifle, the brainchild of another expatriate Polish designer, Kenneth Janusciewski (Janson). Produced in several different calibres including .280, the later .280/30 (7x43mm), and 7.62x51mm (7.62NATO). As told in Thomas B Dugelby's 1980 Collector Grade Book *EM-2 Concept & Design*, the EM-2 in the .280/30 configuration enjoyed a very brief heyday in 1951 as the British "Rifle no 9" the world's first militarily adopted bullpup.

Courtesy Ministry of Defence Pattern Room, Nottingham,
photo by Thomas B Dugelby

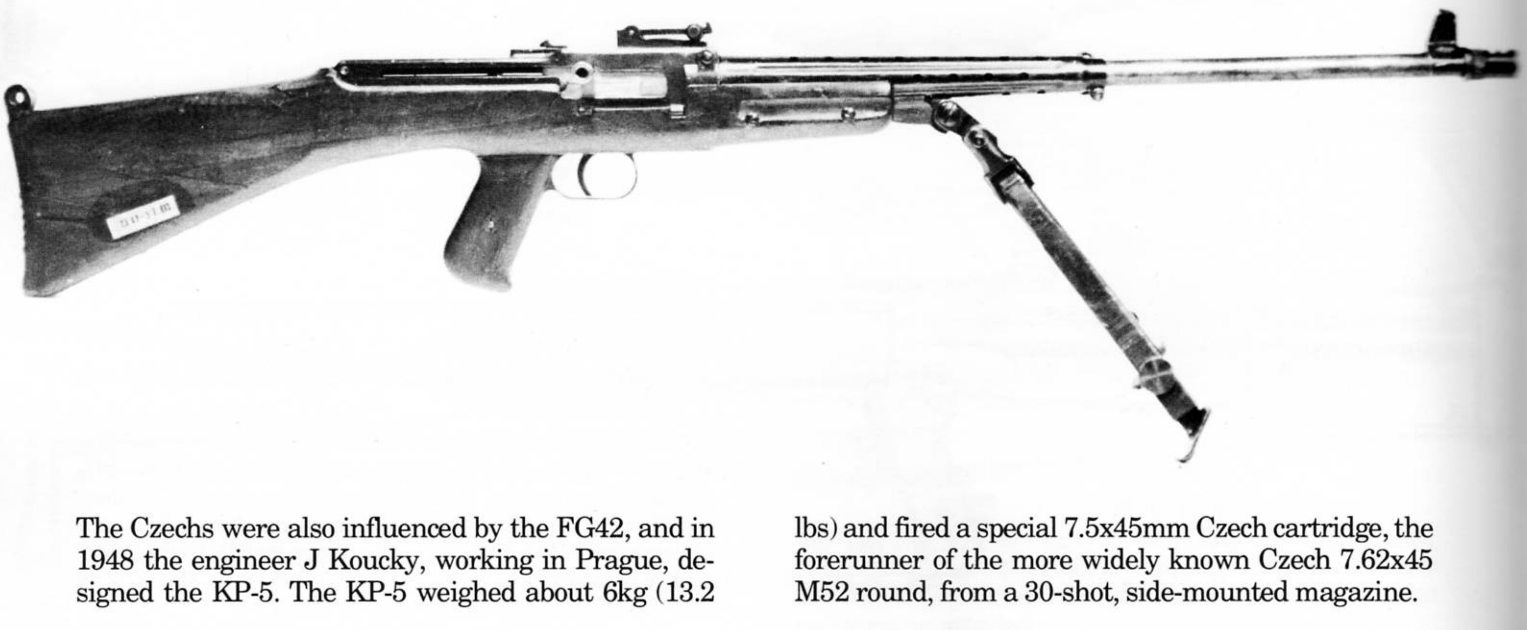
The Korsac rifle provided the British with a base for further design work, and was soon followed by two more "bullpup" rifles, the EM-1 (Thorpe) and the EM-2. The former, in calibre .280 British (7x43mm), was the work of a team headed by Stanley Thorpe. Although designed to the same specification as the Korsac rifle, the EM-1 (Thorpe) utilised the interesting roller-locking concept pioneered in the wartime German gas-operated Mauser Gerät 06, in a pressed-steel receiver frankly derivative of the 'late' FG42 and other German designs.

The EM-2 was the product of yet another designer, Kenneth Janson, who while carrying the radical "bullpup" concept to new heights, reverted to an intricately-machined steel receiver reminiscent of the type 'E' FG42. The bolt locking system used in the EM-2 was adapted from the oft-copied, horizontally-opposed moveable lugs originated in 1870 by Lt Friberg of the Swedish Army and later used in variously modified forms in the Kjellman gun of 1907, the Russian Degtyarev DP26 light machine gun and, latterly, the German G41(W) and K43 semi-automatic rifles of World War II.

The Czechoslovakian KP-5

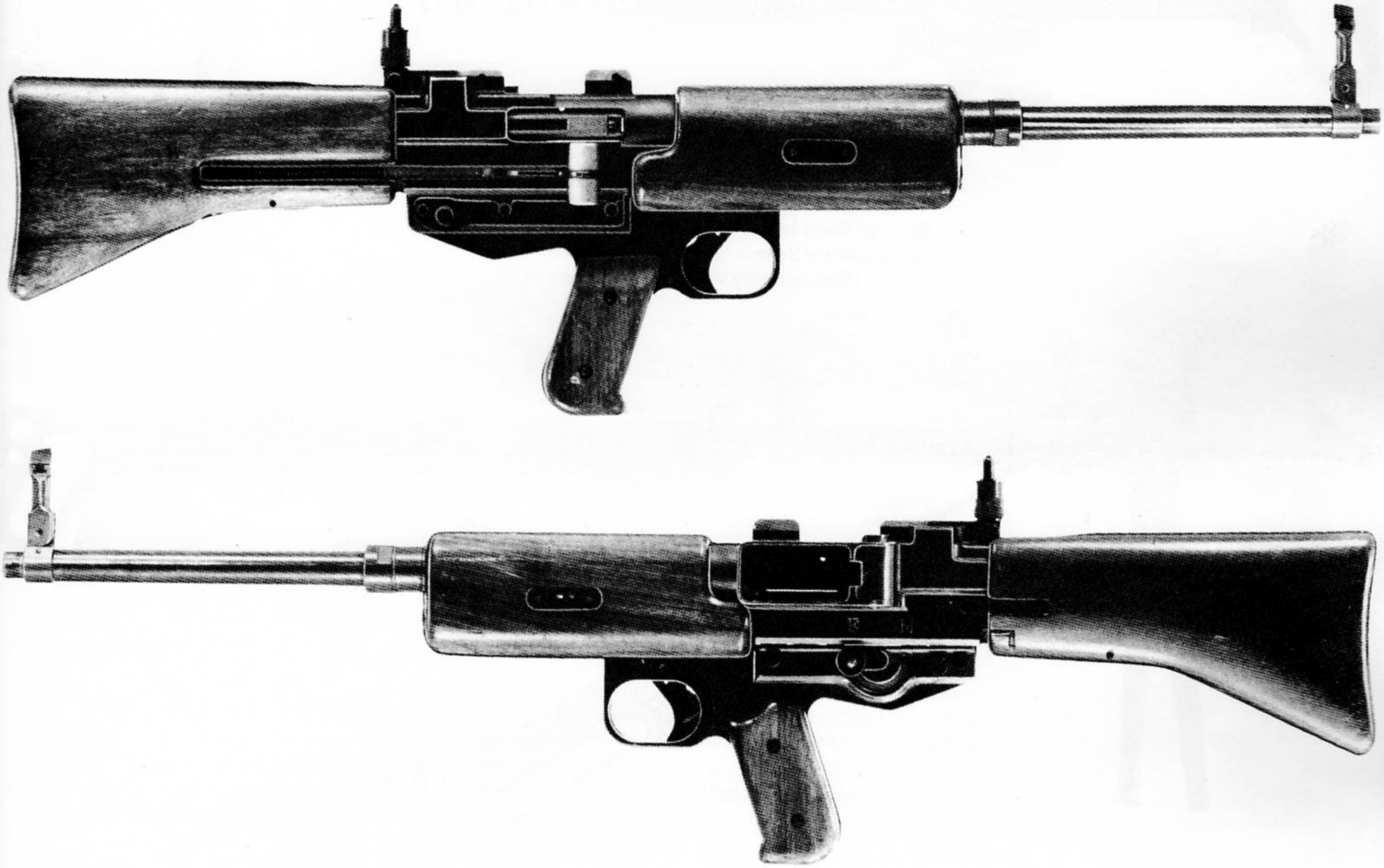


149. Left and right side views of the Czechoslovakian KP-5 rifle, produced in Prague to the design of engineer J Koucky in calibre 7.5x45mm Czech. Note the FG42-inspired bipod and side-mounted magazine well. Courtesy *Vojensky Historicky Ustav* Prague, photo by Thomas B Dugelby



The Czechs were also influenced by the FG42, and in 1948 the engineer J Koucky, working in Prague, designed the KP-5. The KP-5 weighed about 6kg (13.2 lbs) and fired a special 7.5x45mm Czech cartridge, the forerunner of the more widely known Czech 7.62x45 M52 round, from a 30-shot, side-mounted magazine.

The Swiss Bern Assault Rifles

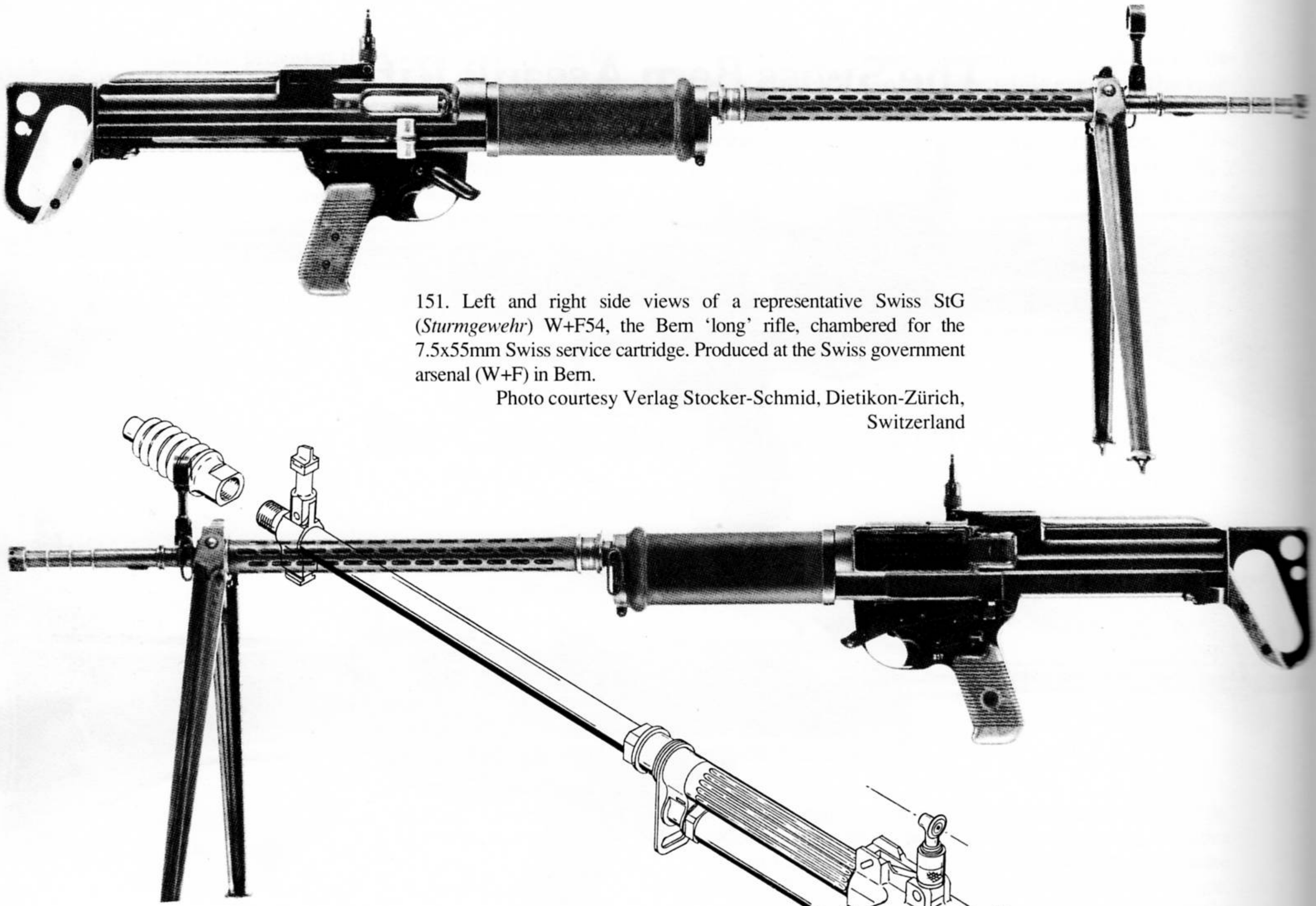


150. Left and right side views of a representative Swiss StG (*Sturmgewehr*) W+F51, the Bern 'short' rifle, produced in calibre 7.5x38mm *kurz* at the Swiss government arsenal (W+F) in Bern.
Photo courtesy Verlag Stocker-Schmid, Dietikon-Zürich, Switzerland

Since the end of World War II the ever-inventive Swiss have produced an astounding variety of experimental assault rifles, at least two types of which were based directly on the FG42. The first of these was a series of 'short' assault rifles fitted with 30-round, side-mounted magazines and firing the short 7.5x38mm round which the Swiss copied from the German 7.92x33mm *kurz* cartridge of World War II. These were produced in several configurations and with varying barrel lengths as the StG (*Sturmgewehr*, or 'storm rifle') W+F 51 and StG W+F 52. (The uniquely Swiss 'W+F' designation, literally *"Waffen*-Swiss-*Fabrik"*, refers to arms produced at the Swiss government arsenal in Bern.)

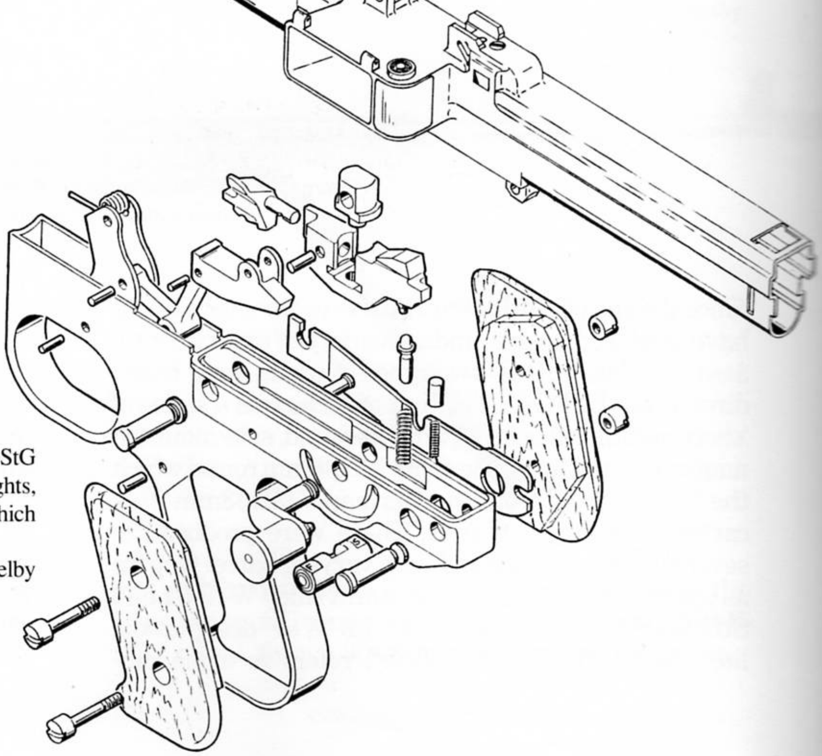
A number of variants of the later series, sometimes called the Bern 'long' rifles, were chambered for the standard Swiss 7.5x55 model 1911 rifle cartridge, and were produced as the StG W+F 54, StG W+F 55, and StG W+F 56.

Both of these weapons series closely follow the FG42 design, to the degree that most of the internal components of the trigger mechanism of the 'short' Bern rifles are interchangeable with those of the type 'G' FG42.



151. Left and right side views of a representative Swiss StG (*Sturmgewehr*) W+F54, the Bern 'long' rifle, chambered for the 7.5x55mm Swiss service cartridge. Produced at the Swiss government arsenal (W+F) in Bern.

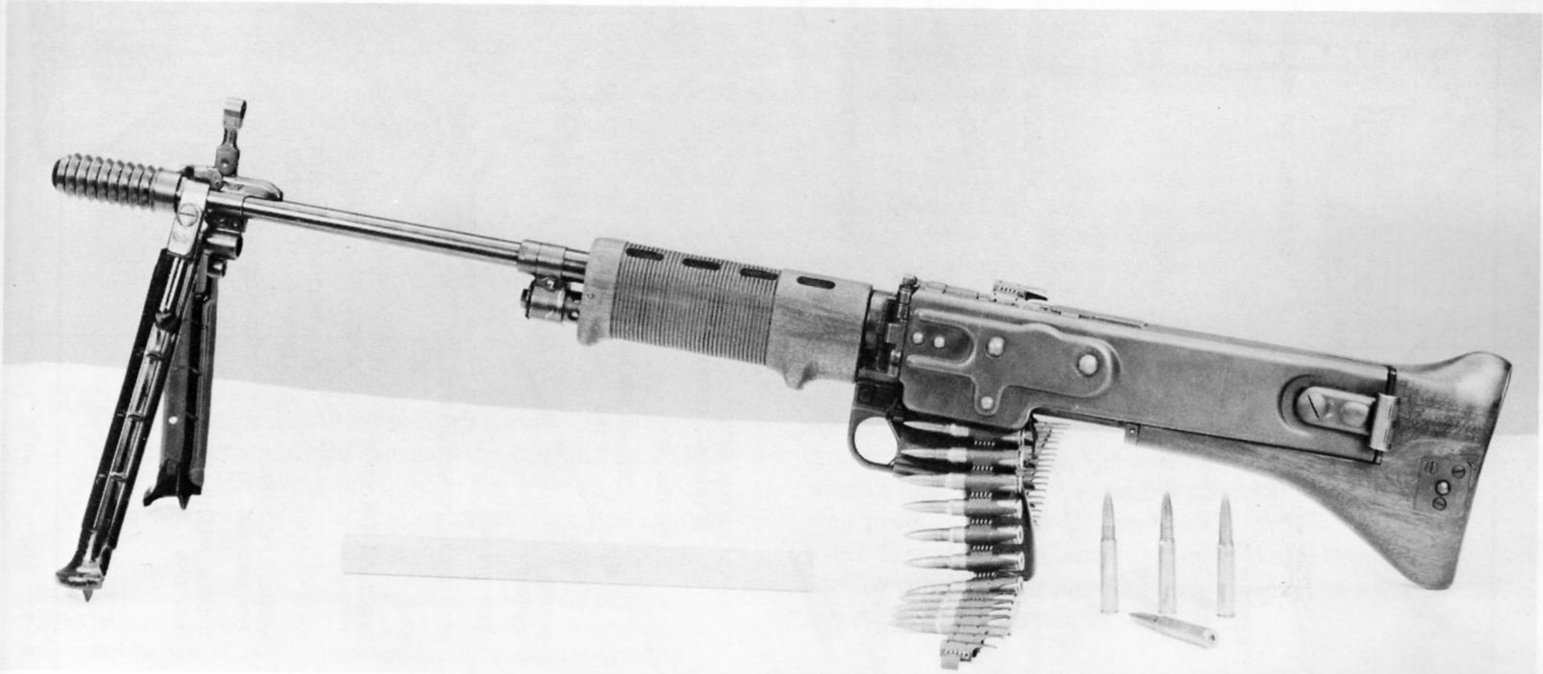
Photo courtesy Verlag Stocker-Schmid, Dietikon-Zürich, Switzerland



152. A left side exploded isometric view of the gas-operated Swiss StG W+F51. Note the similarities to the FG42, especially in the sights, magazine location and trigger mechanism, some components of which are interchangeable with those of the type 'G' FG42.

Drawing by Thomas B Dugelby

The US Belt-Feed FG42 – the Bridge Tool & Die T44

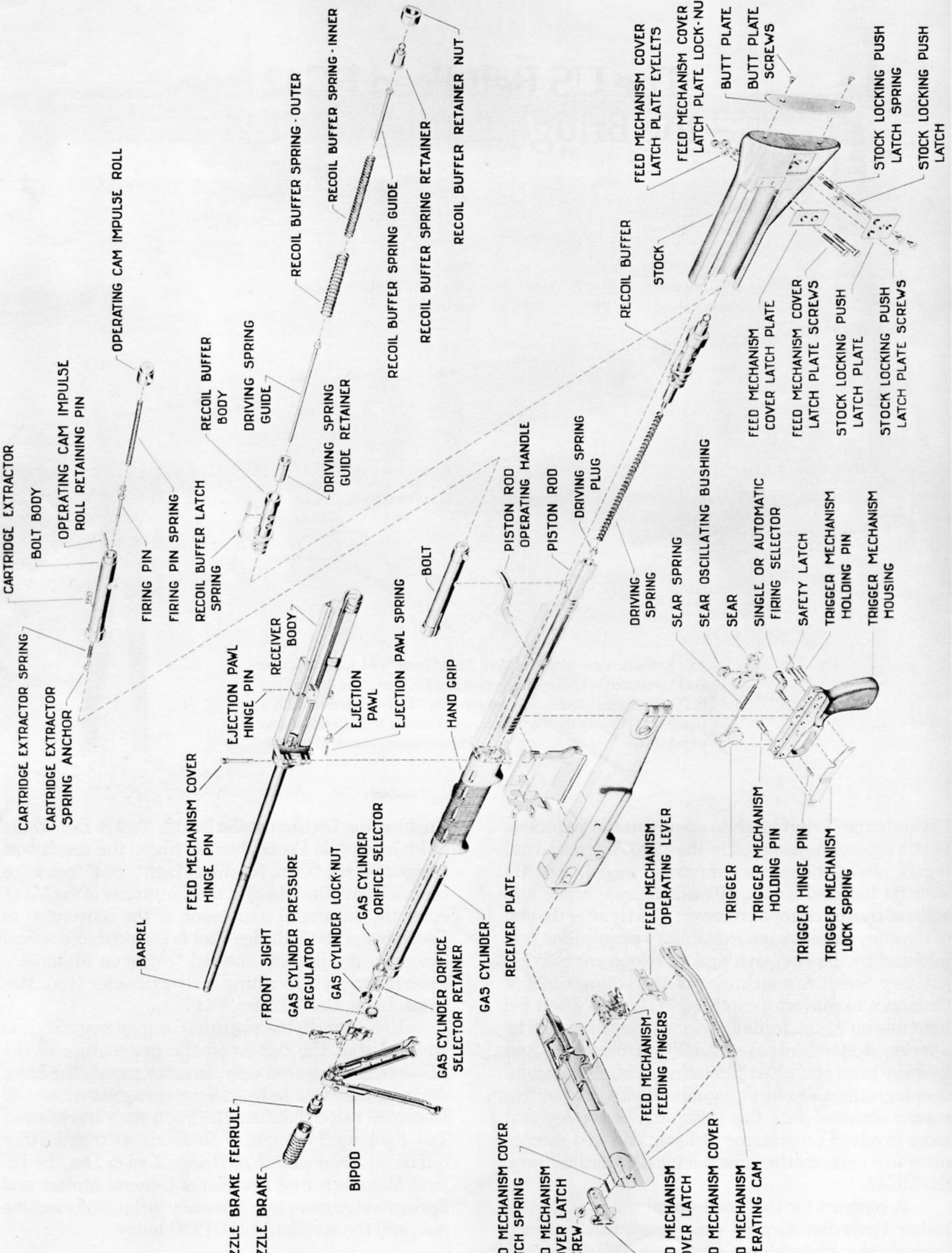


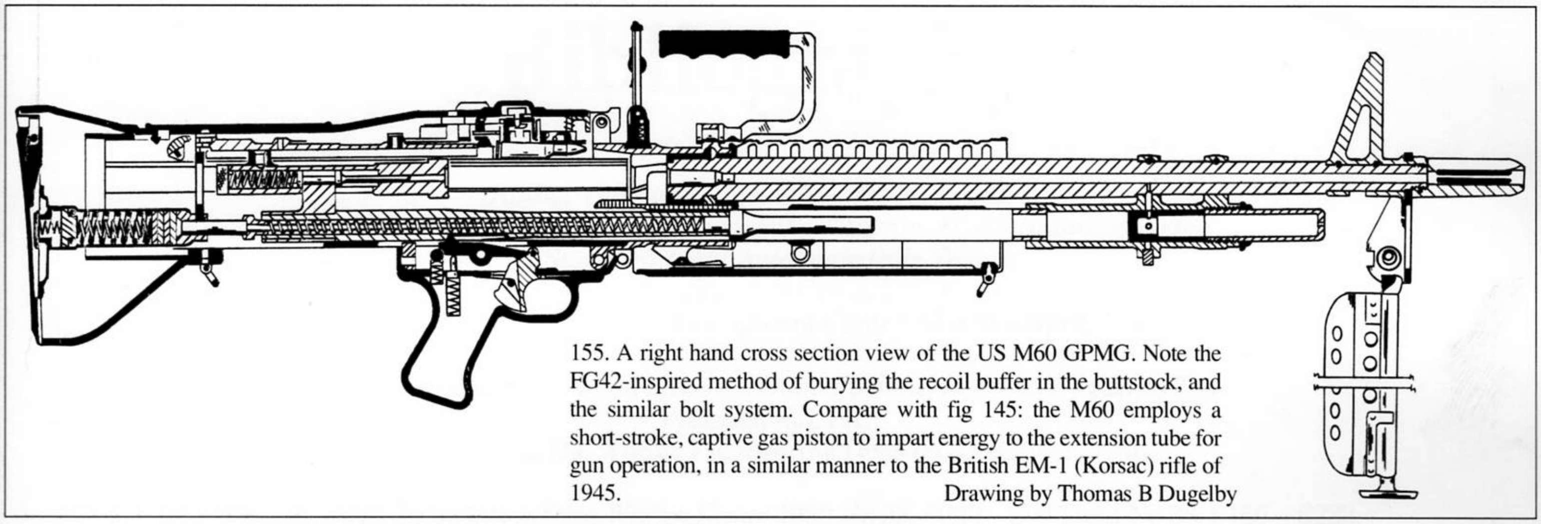
153. Left side view of the belt-fed, 7.92x57mm "T44 Light Machine Gun", produced in 1946 by the Engineering Division of the Bridge Tool & Die Works in Philadelphia, Pennsylvania. The T44 was essentially a type 'G' FG42 with the feed system of a German MG42 grafted onto its left side. Photo courtesy Harold E Johnson

US Ordnance found much to admire in the audacious FG42; especially, as noted in the 1946 Aberdeen trial report, above, the late or "improved" model (type 'G') with its buffered action, efficient muzzle brake and state-of-the-art stamped receiver. Shortly after the end of the war, therefore, an exploratory programme was initiated by the Research and Development Service, Artillery Small Arms Branch of the Office, Chief of Ordnance to convert a captured FG42 into a belt-fed light machine gun. Initially this was accomplished by altering a standard 20-round FG42 magazine and feedway to accept belted 7.92mm cartridges from non-disintegrating German ammunition belts. The positive results obtained with this initial conversion led to a more involved programme utilising the feed mechanism from yet another much-admired German arm, the MG42.

A contract for the "mechanical solution" to this rather Pavlovian surgical experiment was assigned through the Philadelphia Ordnance District to the Engineering Division of the Bridge Tool & Die Works of Philadelphia, Pennsylvania, where the result was designated the "Gun, Machine, Light, T44" (not to be confused with the T44 *rifle*, the forerunner of the M14). After the successful completion of the conversion in December of 1946, Bridge Tool & Die produced a final report on the project entitled "Notes on Materiel – Description and Operating Instructions for Gun, Machine, Light, Cal 7.92mm, T44".

Even though the wartime German manuals had stressed that the full-automatic fire feature of the FG42 was to be used only "in emergency", the basic design of the FG42 proved strong enough to withstand sustained belt-fed automatic fire in the experimental T44 light machine gun – so much so that further combined development at Bridge Tool & Die, the Inland Manufacturing Division of General Motors and Springfield Armory led ultimately to the M60 machine gun, still the standard US GPMG today.

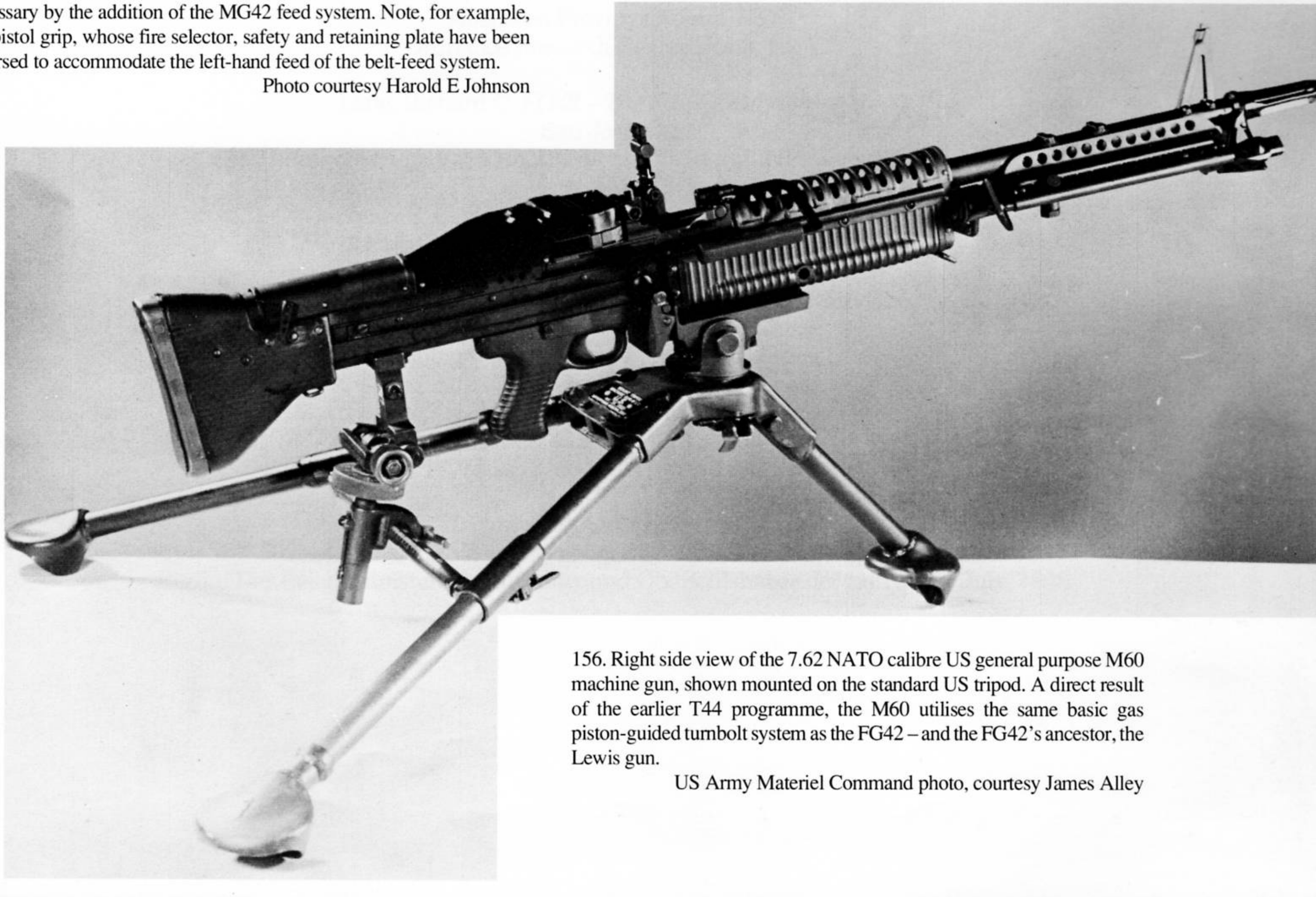

MUZZLE BRAKE
MUZZLE BRAKE FERRULE
BIPOD
BARREL
FRONT SIGHT
GAS CYLINDER PRESSURE REGULATOR
GAS CYLINDER LOCK-NUT
GAS CYLINDER ORIFICE SELECTOR
GAS CYLINDER ORIFICE SELECTOR RETAINER
GAS CYLINDER
FEED MECHANISM COVER HINGE PIN
CARTRIDGE EXTRACTOR SPRING
CARTRIDGE EXTRACTOR SPRING ANCHOR
CARTRIDGE EXTRACTOR
BOLT BODY
OPERATING CAM IMPULSE ROLL RETAINING PIN
FIRING PIN
FIRING PIN SPRING
RECOIL BUFFER LATCH SPRING
RECOIL BUFFER BODY
DRIVING SPRING GUIDE
DRIVING SPRING GUIDE RETAINER
OPERATING CAM IMPULSE ROLL
RECOIL BUFFER SPRING - OUTER
RECOIL BUFFER SPRING - INNER
RECOIL BUFFER SPRING GUIDE
RECOIL BUFFER SPRING RETAINER
RECOIL BUFFER RETAINER NUT
EJECTION PAWL HINGE PIN
RECEIVER BODY
EJECTION PAWL
EJECTION PAWL SPRING
HAND GRIP
BOLT
PISTON ROD OPERATING HANDLE
PISTON ROD
DRIVING SPRING PLUG
DRIVING SPRING
RECOIL BUFFER
STOCK
FEED MECHANISM COVER LATCH PLATE EYELETS
FEED MECHANISM COVER LATCH PLATE LOCK-NUTS
BUTT PLATE
BUTT PLATE SCREWS
STOCK LOCKING PUSH LATCH SPRING
STOCK LOCKING PUSH LATCH
FEED MECHANISM COVER LATCH PLATE
FEED MECHANISM COVER LATCH PLATE SCREWS
STOCK LOCKING PUSH LATCH PLATE
STOCK LOCKING PUSH LATCH PLATE SCREWS
SEAR SPRING
SEAR OSCILLATING BUSHING
SEAR
SINGLE OR AUTOMATIC FIRING SELECTOR
SAFETY LATCH
TRIGGER MECHANISM HOLDING PIN
TRIGGER MECHANISM HOUSING
TRIGGER
TRIGGER MECHANISM HOLDING PIN
TRIGGER HINGE PIN
TRIGGER MECHANISM LOCK SPRING
RECEIVER PLATE
FEED MECHANISM OPERATING LEVER
FEED MECHANISM FEEDING FINGERS
FEED MECHANISM COVER LATCH SPRING
FEED MECHANISM COVER LATCH SCREW
FEED MECHANISM COVER LATCH
FEED MECHANISM COVER
FEED MECHANISM OPERATING CAM



155. A right hand cross section view of the US M60 GPMG. Note the FG42-inspired method of burying the recoil buffer in the buttstock, and the similar bolt system. Compare with fig 145: the M60 employs a short-stroke, captive gas piston to impart energy to the extension tube for gun operation, in a similar manner to the British EM-1 (Korsac) rifle of 1945. Drawing by Thomas B Dugelby

Thus rather ironically our story comes full circle, for the gas piston-guided turnbolt system of the FG42, which the US Army adopted in the M60 as the finest in late-war German ordnance technology, had in reality originated in the 1890s as the design of an American, Samuel N McClean. As embodied in the world's first true light machine gun the Lewis, which was produced in great numbers by the British and much feared by the Germans during World War I, the McClean bolt system had already been offered to the US Army and rejected, in 1913!

154 (Overleaf). A left side exploded isometric view of the belt-fed, 7.92x57mm Bridge Tool & Die T44 Light Machine Gun, showing the many identical type 'G' FG42 components, and the modifications made necessary by the addition of the MG42 feed system. Note, for example, the pistol grip, whose fire selector, safety and retaining plate have been reversed to accommodate the left-hand feed of the belt-feed system.
Photo courtesy Harold E Johnson



156. Right side view of the 7.62 NATO calibre US general purpose M60 machine gun, shown mounted on the standard US tripod. A direct result of the earlier T44 programme, the M60 utilises the same basic gas piston-guided turnbolt system as the FG42 – and the FG42's ancestor, the Lewis gun.
US Army Materiel Command photo, courtesy James Alley

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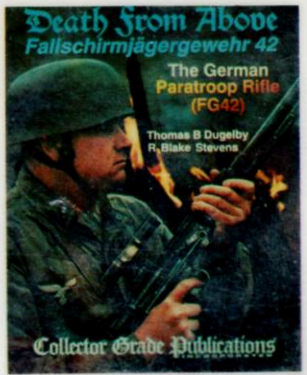

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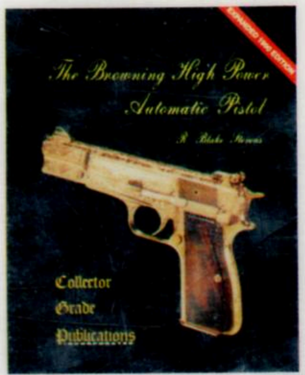
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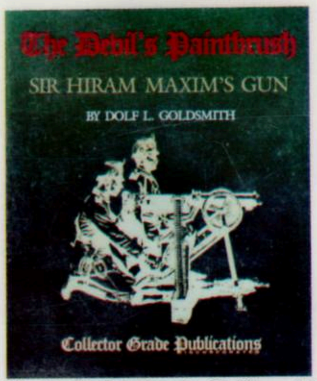

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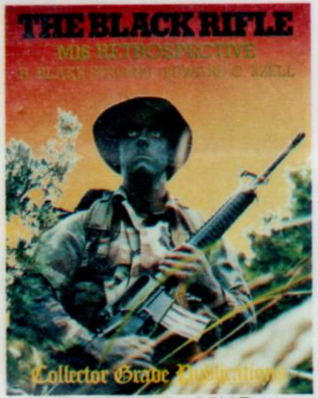
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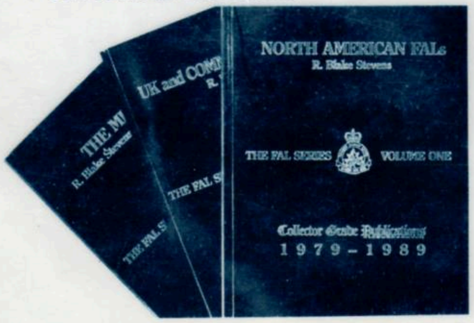

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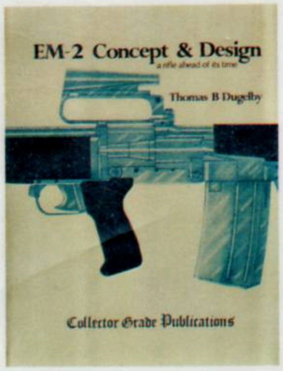

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